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I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE "EXPRESS MAIL POST OFFICE TO ADDRESSEE" SERVICE UNDER 37 CFR 1.10 ON THE DATE INDICATED ABOVE AND IS ADDRESSED TO: BOX PATENT APPLICATION, ASSISTANT COMMISSIONER FOR PATENTS, WASHINGTON, DC 20231		
SIGNED <u>Marek Albosza</u>	DATE <u>21 Nov. '97</u>	
MAREK ALBOSZTA		

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): Stephen J. Brown

Title: Computerized Reward System for Encouraging Participation in a Health Management Program

Enclosed are:

- ☒ 53 sheets of Specification
- ☒ 29 sheet(s) of [ ] informal ☒ formal drawings
- ☒ Declaration
- ☒ An assignment of the invention to: **Raya System, Inc.** and Assignment Cover Letter
- ☒ A check in the amount of \$40 for recordation of the assignment
- ☒ A verified statement to establish small entity status under 37 CFR 1.9 and CFR 1.27
- ☒ Power of Attorney by assignee
- ☐ An information disclosure statement
- ☒ A check in the amount of \$439 to cover the filing fee, calculated as shown below.

For:	No. Filed	No. Extra	Small Entity Rate	Small Entity Fee	Large Entity Rate	Large Entity Fee
Basic Fee	1		\$395	\$395		
Total Claims	24	4	\$11	\$44		
Indep. Claims	2	0	\$41	\$0		
Mult. Dep. Claim	0	0	\$130	\$0		
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Respectfully submitted,

Dated: 21 Nov. '97

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**Patent Application**

of

**Stephen J. Brown**

for

**Computerized Reward System For Encouraging  
Participation In A Health Management Program**

**RELATED APPLICATIONS**

This application is a continuation in part of application  
Ser. No. 08/771,951 filed 12/23/96. This application is also  
related to concurrently filed application titled "Multi-User  
Remote Health Monitoring System". The above named  
applications are herein incorporated by reference.

**FIELD OF THE INVENTION**

The present invention relates generally to remote monitoring  
systems, and in particular to a computerized reward system  
for encouraging participation in a health management program.

**BACKGROUND OF THE INVENTION**

In recent years, an increasing number of healthcare providers  
have initiated outpatient or health management programs for  
their patients. The potential benefits of these home-based  
self-care programs are particularly great for chronically ill  
patients, such as those suffering from diabetes or asthma,  
who must treat their diseases on a daily basis. However, the  
success of these home self-care programs is currently limited  
by each patient's initiative and motivation to comply with a  
prescribed treatment plan for his or her disease.

The most common reason a patient fails to comply with a treatment plan is a lack of motivation to treat the disease when the disease is not causing an immediately recognizable effect. The expected effect of most diseases is pain or discomfort, and once the pain or discomfort stop, many patients ignore the disease. Of course, most healthcare issues can be addressed more effectively through prevention. The challenge is in communicating the preventative concept to a patient in such a way that he or she will be motivated and encouraged to comply with a prescribed treatment plan.

A patient's lack of motivation to comply with a treatment plan also limits the ability of a healthcare provider to aid the patient in treating his or her disease. Many treatment plans require daily monitoring of a physiological condition of the patient, such as blood glucose concentration in diabetes, peak flow rates in asthma, and blood pressure in hypertension. Since the patients themselves monitor their conditions in outpatient programs, the healthcare provider is often limited to learning each patient's status strictly through patient-initiated events, whether an emergency visit or a phone call to tell the provider the patient's latest medical data. Even with the current availability of remote monitoring devices that store and transmit medical data from a patient's home to a medical clinic, the provider must still wait for medical information whose arrival depends on the patient's initiative.

As a result, the majority of the provider's time when caring for patients with chronic medical conditions is spent with the patients who are the most motivated and eager for treatment, while the greatest medical needs remain with the less motivated patients who do not visit the provider or transmit their medical data. These less motivated patients often develop urgent medical needs that could have been

prevented with proper compliance with their prescribed treatment regimens. Consequently, the cost of treating their diseases is much higher than one might expect given the sophistication of current medical monitoring devices.

5

Interactive home healthcare monitoring systems are described in U.S. Patent Nos. 5,390,238 issued to Kirk et al. on February 14, 1995, 5,434,611 issued to Tamura on July 18, 1995, and 5,441,047 issued to David et al. on August 15, 10 1995. One disadvantage of these systems is that they either require a patient to call in to a central facility to be monitored or require the central facility to call the patient according to a rigid monitoring schedule. In addition, these monitoring systems do not provide a patient with any 15 incentives. As such, it is unlikely a patient will make use of them regularly.

U.S. Patent No. 5,488,423 by Walkingshaw describes a home communication apparatus which prints out rewards or coupons 20 in consumer categories which the user prefers. U.S. Patent No. 5,502,636 by Clarke describes a personalized coupon generating and processing system which gives users coupons based on their consumer profiles. U.S. Patent No. 5,504,519 by Remillard describes a method and apparatus for printing 25 coupons which allows a user to select the coupons or other printed information he or she wants. The chosen coupons or information are printed at a central facility and then sent to the user. These inventions do not include any sort of health management program as the reason for receiving the 30 coupons, however.

Home-based computerized reward systems are also described in U.S. Patent Nos. 5,034,807, 5,128,752, 5,227,874, and 5,249,044 by Von Kohorn. These inventions taken together 35 describe a system and method for evaluating a user's

responses to broadcast programs. The programs are broadcast to a wide, undefined audience of users. Users can then enter in their responses to the broadcast programs via a keyboard or other response transmitting device. The user's responses are then transmitted to the response receiving station. A reward, such as a coupon, can be printed for the user from a printer located in the user's home.

This invention does not teach the modification of health-related behavior. Even in combination with health monitoring systems, this invention cannot be effectively used for healthcare programs because it is not individualized for different patients having different diseases or conditions. One broadcast program is sent at one time to all users who have the ability to receive the program. Thus a user who has diabetes would receive the same broadcast program as a user who needs to lose weight. In addition, the broadcast programs are difficult to customize to the individual viewer. For example, one diabetes program would be shown to all diabetics, without regard to their different needs. Although a number of broadcast programs could be created in order to accommodate all possible users, it would be prohibitively expensive and unwieldy. It would be much more efficient to have a dynamic program which could be adjusted for each particular user. Finally, in this invention, the transmitting station determines when the programs are broadcast, which is inconvenient to the user. It is much more convenient for the user to be able to view and/or hear a program when he or she wants.

#### **OBJECTS AND ADVANTAGES OF THE INVENTION**

In view of the above, it is an object of the present invention to provide a computerized reward system for encouraging an individual to participate in a customized health management program. It is another object of the

present invention to provide a computerized reward system for encouraging an individual to participate in a customized health management program. Another object of the present invention is to provide an individual with a remote apparatus  
5 for use in a customized health management program which offers a reward. Another object of the present invention is to provide an individual with a DTMF telephone for use in a customized health management program which offers a reward. Another object of the present invention is to provide an  
10 individual with a multimedia processor for use in a customized health management program which offers a reward. A further object of the present invention is to provide an individual with a data card for use in a customized health management program which offers a reward.

15 These and other objects and advantages will become more apparent after consideration of the ensuing description and the accompanying drawings.

#### 20 SUMMARY

The present invention is a computerized reward system for encouraging participation in a health management program. The system comprises a monitoring means for collecting compliance data on an individual participating in the health  
25 management program, memory means for storing the compliance data, evaluation means for comparing the compliance data with evaluation criteria to determine whether or not the individual is compliant, and a reward to be given to the individual who is deemed compliant.

30 The system includes a script generator for generating a customized script for each individual participating in the health management program. The system also includes a script assignor for assigning the customized script to the  
35 individual. The system further includes a database for

storing the customized script programs and the script assignments.

5 The memory means of the system includes compliance instructions, which include a description of at least one action the individual must perform in order to satisfy the evaluation criteria.

10 The individual participates in the health management program by use of a remotely programmable apparatus. The apparatus has a display screen to display compliance questions to the individual. The apparatus also has push buttons or a speech synthesizer with which the individual can enter in answers to the questions. The apparatus connects to the health  
15 monitoring server by a communication means, such as a telephone network or the Internet. The apparatus also contains device jacks to connect the apparatus to a printer and a monitoring device, such as a blood glucose meter.

20 In another embodiment, the computerized reward system comprises a interactive telephone call, whereby the individual is asked and answers compliance questions over the telephone. In another embodiment, the computerized reward system includes an educational program which the individual  
25 views or hears. The individual then responds to the educational program. For all embodiments, the individual's responses and compliance status can be stored in a database.

30 The reward given to the compliant individual can be a coupon, an electronic reward credited to a data card, or an electronic reward credited to the individual's account at a participating financial institution or retail account.

## BRIEF DESCRIPTION OF THE DRAWINGS

- Fig. 1 is a block diagram of the networked system according to the preferred embodiment of the present invention.
- 5 Fig. 2 is a block diagram illustrating the interaction of the components of the system of Fig. 1.
- Fig. 3 is a perspective view of a remotely programmable apparatus of the system of Fig. 1.
- Fig. 4 is a block diagram illustrating the components of the apparatus of Fig. 3.
- 10 Fig. 5A is a script entry screen according to the preferred embodiment of the present invention.
- Fig. 5B is a continuation of the script entry screen of Fig. 5A.
- 15 Fig. 6A is a listing of a sample script program according to the preferred embodiment of the present invention.
- Fig. 6B is a continuation of the listing of Fig. 6A.
- Fig. 7 is a sample script assignment screen according to the preferred embodiment of the invention.
- 20 Fig. 8 is a sample question appearing on the display of the apparatus of Fig. 3.
- Fig. 9 is a sample prompt appearing on the display of the apparatus of Fig. 3.
- 25 Fig. 10 is a sample congratulatory message appearing on the display of the apparatus of Fig. 3.
- Fig. 11 is a sample instruction appearing on the display of the apparatus of Fig. 3.
- Fig. 12 is a sample coupon printed by the present invention.
- 30 Fig. 13 is a sample report displayed on the workstation of Fig. 1.
- Fig. 14A is a flow chart illustrating the steps included in the monitoring application executed by the server



of Fig. 1 according to the preferred embodiment of the present invention.

Fig. 14B is a continuation of the flow chart of Fig. 14A.

Fig. 15A is a flow chart illustrating the steps included in the script program of Figs. 14A and 14B.

Fig. 15B is a continuation of the flow chart of Fig. 15A.

Fig. 15C is a continuation of the flow chart of Fig. 15B.

Fig. 16 is a perspective view of the remotely programmable apparatus according to the second embodiment of the present invention.

Fig. 17 is a sample message appearing on the display of Fig. 3.

Fig. 18 is a sample pre-printed coupon to be validated using the present invention.

Fig. 19 is a block diagram illustrating the components of the apparatus of Fig. 16.

Fig. 20 is a block diagram of the networked system according to the third embodiment of the present invention.

Fig. 21 is a block diagram illustrating the interaction of the components of the system of Fig. 20.

Fig. 22 is a block diagram illustrating the components of the multimedia processor of Fig. 20.

Fig. 23 is a plan specification screen used in the system of Fig. 20.

Fig. 24 is a plan assignment screen used in the system of Fig. 20.

Fig. 25 is a sample compliance questionnaire used in the system of Fig. 20.

Fig. 26A is a flow chart illustrating the steps included in the monitoring application executed by the server of Fig. 20 according to the preferred embodiment of the present invention.

Fig. 26B is a continuation of the flow chart of Fig. 26A.

Fig. 27 is a block diagram of the networked system according to the fourth embodiment of the invention.

Fig. 28 is a plan specification screen used in the system of Fig. 27.

Fig. 29A is a flow chart illustrating the steps included in the monitoring application executed by the server of Fig. 28 according to the preferred embodiment of the present invention.

Fig. 29B is a continuation of the flow chart of Fig. 29A.

Fig. 30 is a block diagram illustrating the fifth embodiment of the present invention.

Fig. 31 is a flow chart illustrating the steps included in the script program of Fig. 30.

#### DETAILED DESCRIPTION

The present invention is a computerized reward system for encouraging an individual to participate in a health management program. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one of ordinary skill in the art that these specific details need not be used to practice the invention. In addition, this invention is described for as a home healthcare monitoring system. However, it can also be used as any sort of customized monitoring system.

Figs. 1 - 15 shows the preferred embodiment of the computerized reward system. As shown in Fig. 1, networked system 40 includes a server 42, a workstation 44, and at least one patient station 47. It will be apparent to one skilled in the art that server 42 may comprise a single, stand-alone computer or multiple computers distributed throughout a network. Workstation 44 can be any computer or network computer or means of viewing web-based programs

residing on server 42. Server 42, workstation 44, and patient station 47 are connected by a communication network 46. Communication network 46 can be any means which allows information to be passed from one device to another, such as  
5 a telephone network, a cellular network, a wireless network, or the Internet.

Patient station 47 comprises a remote apparatus 48, a coupon printer 54, and, optionally, a monitoring device 50. Remote  
10 apparatus 48 is designed to interact with an individual in accordance with a script program sent from server 42. Remote apparatus 48 can display compliance questions sent from the server 42 to an individual, receive responses to the compliance questions, and send them back to server 42 to be  
15 evaluated. Remote apparatus 48 has a printer jack for connecting to printer 54. In an alternative embodiment, printer 54 can be integrated into remote apparatus 48. Remote apparatus 48 can thus send information from server 52 to printer 54 to be printed for the individual. Remote  
20 apparatus 48 also has a device jack which allows it to upload information, such as a individual's physiological measurements from a monitoring device, and send the information to server 42. Remote apparatus 48 is described in more detail below and in Figs. 3 and 4.

25 Coupon printer 54 is designed to print coupons if the individual is deemed compliant by the health management program. Coupon printer can be any sort of printer, such as a calculator or cashier tape printer, a thermal printer, or a  
30 laser printer. The type of printer used is dependent on the type of coupon to be printed out by system 40. For example, a coupon which consists of an alphanumeric code can be printed out by a cashier type printer, while a coupon which has a bar code or a graphic is likely to be printed out by a

laser printer. Coupon printer **54** communicates with remote apparatus **48** by a standard connection cable **56**.

A monitoring device **50** can also be attached to remote apparatus **48**. Monitoring device **50** is designed to produce measurements of a physiological condition of the individual, record the measurements, and transmit the measurements to remote apparatus **48** through a standard connection means **52**. The measurements can be used as compliance data. Examples of suitable monitoring devices include blood glucose meters, respiratory flow meters, blood pressure cuffs, electronic weight scales, and pulse rate monitors. Such monitoring devices are well known in the art. The specific type of monitoring device provided to each individual is dependent upon the individual's disease. For example, diabetic individuals are provided with blood glucose meters for measuring blood glucose concentrations, asthmatic individuals are provided with respiratory flow meters for measuring peak flow rates, overweight individuals are provided with weight scales, etc.

Although Fig. **1** shows remote apparatus **48**, coupon printer **54**, and monitoring device **50** as three separate components, they can be placed in the same housing. In addition, only two patient stations **47** are shown, but it is to be understood that system **40** can include any number of patient stations **47** for any number of individuals.

Fig. **2** shows server **42**, workstation **44**, and remote apparatus **48** in greater detail. Server **42** includes a database **58** for storing customized health management script programs **60**. Customized health management script programs **60** are executed by remote apparatus **48** to communicate compliance questions to the individual, receive answers **62** to the questions, collect monitoring device measurements **64**, and transmit answers **62**

and measurements 64 to server 42. Database 58 is also designed to store responses 62 and measurements 64. Database 58 further includes a look-up table 66. Table 66 contains a list of the individuals participating in the health management program, and for each individual, a unique identification code and a respective pointer to customized health management script programs 60 assigned to the individual. Each remote apparatus 48 is designed to execute assigned customized health management script programs 60 which it receives from server 42.

Figs. 3 and 4 show the structure of each remote apparatus 48 according to the preferred embodiment. Referring to Fig. 3, remote apparatus 48 includes a housing 84. Housing 84 is preferably sufficiently compact to enable apparatus 48 to be hand-held and carried by an individual, but can also be a fixed device such as a television set top. Remote apparatus 48 also includes a display 86 for displaying compliance questions and prompts to the individual. In the preferred embodiment, display 86 is a liquid crystal display (LCD). In an alternative embodiment, display 86 is a television set.

Four user input buttons 90A, 90B, 90C, and 90D are located adjacent display 86. User input buttons 90A, 90B, 90C, and 90D are for entering in remote apparatus 48 responses to the compliance questions and prompts. In the preferred embodiment, user input buttons 90A, 90B, 90C, and 90D are momentary contact push buttons. In alternative embodiments, user input buttons 90A, 90B, 90C, and 90D may be replaced by switches, keys, a touch sensitive display screen, a remote control unit, or any other data input device.

A monitoring device jack 94 is located on a surface of housing 48. Monitoring device jack 94 is for connecting remote apparatus 48 to a number of monitoring devices, such

as blood glucose meters, respiratory flow meters, or blood pressure cuffs, through respective connection cables (not shown). Remote apparatus **48** also includes a modem jack **96** for connecting remote apparatus **48** to a telephone jack through a standard connection cord (not shown). Remote apparatus **48** also includes a printer jack **92** for connecting remote apparatus **48** to a printer through a standard connection cord (not shown). Remote apparatus **48** further includes a visual indicator, such as a light emitting diode (LED) **88**. LED **8** is for visually notifying the individual that he or she has unanswered compliance questions stored in apparatus **48**.

Fig. **4** is a schematic block diagram illustrating the components of remote apparatus **48** in greater detail. Remote apparatus **48** includes a processor **98**, and a memory **100** connected to processor **98**. Memory **100** is preferably a non-volatile memory, such as a serial EEPROM. Memory **100** stores customized compliance script programs **60** received from server **42**, measurements **64** received from monitoring device **50**, the individual's answers **62** to compliance questions, and the individual's unique identification code. Processor **98** also includes built-in read only memory (ROM) which stores firmware for controlling the operation of remote apparatus **48**. The firmware includes a script interpreter used by processor **98** to execute customized health management script programs **60**. The script interpreter interprets script commands which are executed by processor **98**. Specific techniques for interpreting and executing script commands in this manner are well known in the art.

Processor **98** is preferably connected to memory **100** using a standard two-wire I<sup>2</sup>C interface. Processor **98** is also connected to user input buttons **90A**, **90B**, **90C**, and **90D**, LED **88**, a clock **112**, and a display driver **86**. Clock **112**

indicates the current date and time to processor **98**. For clarity of illustration, clock **112** is shown as a separate component, but is preferably built into processor **98**. Display driver **86** operates under the control of processor **98** to display information on display **86**.

Modem **102** is connected to a telephone jack **104** through modem jack **96**. Modem **102** is for exchanging data with server **42** through communication network **46**. The data includes customized health management script programs **60** which are received from server **42** as well as answers **62** to compliance questions, device measurements **64**, script identification codes, and the individual's unique identification code which modem **102** transmits to server **42**. Modem **102** is preferably a complete 28.8 K modem commercially available from Cermetek, although any suitable modem may be used. In addition, other communication means such as wireless, cellular, or cable modems, etc. may also be used.

Device interface **108** is connected to device jack **94**. Device interface **108** is for interfacing with a number of monitoring devices, such as blood glucose meters, respiratory flow meters, blood pressure cuffs, weight scales, or pulse rate monitors, through device jack **94**. Device interface **108** operates under the control of processor **98** to collect measurements **64** from monitoring device **50**, and to output measurements **64** to processor **98** for storage in memory **100**. In the preferred embodiment, device interface **108** is a standard RS232 interface. For simplicity of illustration, only one device interface **108** is shown in Fig. **4**. However, in alternative embodiments, remote apparatus **48** may include multiple device interfaces to accommodate monitoring devices which have different connection standards. In addition, monitoring devices can be integrated in the same housing as remote apparatus **48**.

Printer interface **110** is connected to printer jack **92**.  
Printer interface **110** is for interfacing with printer **54**.  
Printer interface **110** operates under the control of processor  
5 **98**, which receives printing commands from server **42** to be  
sent to printer **54**. In the preferred embodiment, printer  
interface **110** is a standard RS232 interface. For simplicity  
of illustration, only one printer interface **110** is shown in  
Fig. **4**. However, in alternative embodiments, apparatus **48**  
10 may include multiple printer interfaces to accommodate  
printers which have different connection standards.

Referring again to Fig. **2**, server **42** includes a monitoring  
application **68**. Monitoring application **68** is a controlling  
15 software application executed by server **42** to perform the  
various functions described below. Monitoring application **68**  
includes a script generator **70**, a script assignor **72**, and a  
report generator **74**. Script generator **70** is designed to  
generate customized health management script programs **60** from  
20 script information entered through workstation **44**. The  
script information is entered through a script entry screen  
**76**. In the preferred embodiment, script entry screen **76** is  
implemented as a web page on server **42**. Workstation **44**  
includes a web browser for accessing the web page to enter  
25 the script information.

Figs. **5A** and **5B** illustrate script entry screen **76** as it  
appears on workstation **44**. As shown in Fig. **5A**, script entry  
screen **76** includes a script name field **116** for specifying the  
30 name of a customized health management script program to be  
generated. Script entry screen **76** also includes entry fields  
**118** for entering compliance questions to be answered by the  
individual. Each entry field **118** has corresponding response  
choice fields **120** for entering response choices for the  
35 question. A NEXT PAGE button **122** is used to continue down



script entry screen **76**. Obviously, if script entry screen **76** can fit on a single display, NEXT PAGE button **122** is unnecessary.

5 As shown in Fig. **5B**, script entry screen **76** further includes check boxes **124** for selecting a desired monitoring device **50** from which to collect measurements **64**, such as a blood glucose meter, respiratory flow meter, or blood pressure cuff. Script entry screen **76** also displays evaluation  
10 criteria. Each evaluation criterion has a check box **126** which can be selected. More than one evaluation criterion can be selected for each customized health management script program **60**. Each evaluation criterion also has a value entry field **128** where the value the individual needs to meet for  
15 each criterion can be manually entered. For example, if an individual only needs to answer the compliance questions in order to receive a coupon, the value COMPLETED can be entered into the MINIMUM QUESTION SCORE value entry field **128**. In addition, value entry fields **128** allow the administrator to  
20 set a range of criteria which the individual should meet. For example, if the individual should keep his or her blood glucose level between 60-320 mg/dL, 60 mg/dL and 320 mg/dL can be entered into value entry fields **128** corresponding to MINIMUM MEASUREMENT VALUE and MAXIMUM MEASUREMENT VALUE,  
25 respectively.

Script entry screen **76** also includes check boxes **130** for selecting the type of coupon to be delivered to the individual if he or she satisfies the evaluation criteria.  
30 Ideally, the coupon type will correspond to the type of health management script program **60** assigned to the individual. For example, if the individual is a diabetic, he or she can receive a coupon for a sugar-free frozen yogurt, to be redeemed at participating retailers.

35

Script entry screen 76 additionally includes a connection time field 132 for specifying a prescribed connection time at which remote apparatus 48 executing customized health management script program 60 is to establish a subsequent communication link to server 42. The connection time is preferably selected to be the time at which communication rates are the lowest, such as 3:00 AM. Script entry screen 76 has a monitor interval time field 140 for specifying how often the individual should be monitored. Script entry screen 76 also includes a CREATE SCRIPT button 136 for instructing the script generator to generate customized health management script program 60 from the information entered in screen 76. Screen 76 further includes a CANCEL button 138 for canceling the information entered in screen 76. A last feature of script entry screen 76 is a PREVIOUS PAGE button 140 which is used to go back to the first part of script entry screen, as shown in Fig. 5A.

In the preferred embodiment, each customized health management script program 60 created by script generator 70 conforms to the standard file format used on UNIX systems. In the standard file format, each command is listed in the upper case and followed by a colon. Every line in the script program is terminated by a linefeed character {LF}, and only one command is placed on each line. The last character in the script program is a UNIX end of file character {EOF}. TABLE 1 shows an exemplary listing of script commands used in the preferred embodiment of the invention.

TABLE 1 - SCRIPT COMMANDS

Command	Description
CLS: {LF}	Clear the display.
ZAP: {LF}	Erase from memory the last set of question responses recorded.

LED: b{LF}	Turn the LED on or off, where b is a binary digit of 0 or 1. An argument of 1 turns on the LED, and an argument of 0 turns off the LED.
DISPLAY: {chars}{LF}	Display the text following the DISPLAY command.
INPUT: mmmm{LF}	Record a button press. The m's represent a button mask pattern for each of the four input buttons. Each m contains an "X" for disallowed buttons or an "O" for allowed buttons. For example, INPUT: OXOX{LF} allows the user to press either button #1 or #3.
WAIT: {LF}	Wait for any one button to be pressed, then continue executing the script program.
COLLECT: device{LF}	Collect measurements from the monitoring device specified in the COLLECT command. The user is preferably prompted to connect the specified monitoring device to the apparatus and press a button to continue.
NUMBER: aaaa{LF}	Assign a script identification code to the script program. The script identification code from the most recently executed NUMBER statement is subsequently transmitted to the server along with the question responses and device measurements. The script identification code identifies to the server which script program was most recently executed by the remote apparatus.
DELAY: t {LF}	Wait until time t specified in the DELAY command, usually the prescribed connection time.
CONNECT: {LF}	Perform a connection routine to establish a communication link to the server, transmit the patient identification code, question responses, device measurements, and script identification code to the server, and receive and store a new script program. When the server instructs the apparatus to disconnect, the script interpreter is restarted, allowing the new script program to execute.
PRINT: {LF}	Command printer to print information sent from server if individual has met evaluation criteria.

The script commands illustrated in **TABLE 1** are representative of the preferred embodiment and are not intended to limit the scope of the invention. After

consideration of the ensuing description, it will be apparent to one skilled in the art that many other suitable scripting languages and sets of script commands may be used to implement the invention.

5

Script generator **70** preferably stores a script program template which it uses to create each customized health management script program **60**. To generate customized health management script program **60**, script generator **70** inserts  
10 into the template the script information entered in script entry screen **76**. For example, Figs. **6A** and **6B** illustrate a sample customized health management script program **60** created by script generator **70** from the script information shown in Figs. **5A** and **5B**.

15

Customized health management script program **60** includes display commands to display the compliance questions and response choices entered in fields **118** and **120**, respectively. Customized health management script program **60**  
20 also includes input commands to receive answers **62** to the compliance questions. Customized health management script program **60** further includes a collect command to collect device measurements **64** from monitoring device **50** specified in check boxes **124**. Customized health management script program  
25 **60** also includes commands to set the evaluation criteria according to the information entered into screen **76**. Customized health management script program **60** also includes commands to establish a subsequent communication link to server **42** at the connection time specified in field **132**.  
30 Finally, customized compliance script program **60** has a print command, which commands printer **54** to print a coupon if the individual has met the evaluation criteria as specified in script entry screen **76**. The steps included in customized health management script program **60** are also shown in the

flow chart of Figs. **15A - 15C**, and will be discussed in the operation section below.

Referring again to Fig. **2**, script assignor **72** is for  
5 assigning customized health management script program **60** to  
individuals. Customized health management script program **60**  
are assigned in accordance with script assignment information  
entered through workstation **44**. The script assignment  
information is entered through a script assignment screen **78**  
10 which is preferably implemented as a web page on server **42**.

Fig. **7** illustrates a sample script assignment screen **78** as it  
appears on workstation **44**. Screen **78** includes check boxes  
**142** for selecting customized health management script program  
15 **60** to be assigned and check boxes **144** for selecting the  
individuals to whom health management compliance script  
program **60** is to be assigned. Screen **78** also includes an  
ASSIGN SCRIPT button **148** for entering the assignments. When  
button **148** is pressed, the script assignor creates and stores  
20 for each individual selected in check boxes **144** a respective  
pointer to customized health management script program **60**  
selected in check boxes **142**. Each pointer is stored in look-  
up table **66** of database **58**. Screen **78** further includes an  
ADD SCRIPT button **146** for accessing the script entry screen  
25 to create a new customized health management script program  
**60**, and a DELETE SCRIPT button **150** for deleting a customized  
health management script program **60**.

Referring again to Fig. **2**, report generator **74** is designed to  
30 generate an individual's compliance report **80** from responses  
**62** and device measurements **64** received in server **42**. Report  
**80** is displayed on workstation **44**. Fig. **13** shows a sample  
report **80** produced by report generator **74** for a selected  
individual. Report **74** includes a graph **160** of device  
35 measurements **64** received from the individual, as well as a

listing of answers **62** received from the individual. Report **74** also includes a status field **162**, which indicates the compliance status of the individual. Specific techniques for writing a report generator program to display data in this manner are well known in the art.

Fig. **2** also shows coupon printer **54** which has coupons **82**. When coupon printer **54** receives the print command and the information to be printed from server **42** via remote apparatus **48**, it prints out coupon **82**. Coupon printer **54** will only receive the print command and print information if it has been determined that the individual has fulfilled the evaluation criteria. Sample coupon **82** is shown in Fig. **12**. In the preferred embodiment, coupon **82** has an information field **154**, which tells the individual what he or she has just received. Coupon **82** also has a validation time field **152**, which tells the individual the time period during which he or she can redeem coupon **82**. Bar code **156** is a UPC code, while bar code **158** is a household code, which identifies the individual. Bar code **156** is scanned by the retailer when the individual redeems coupon **82** in order to determine the individual's discount. The methods of creating, printing, and scanning bar codes are well known.

An alternative coupon **168** is shown in Fig. **18**. Coupon **168** also has information field **154**, validation time field **152**, and bar codes **156** and **158**, all of which have the same purpose as in coupon **82**. The difference between coupon **82** and coupon **168** is that coupon **168** is preprinted with all of the above features. Preprinted coupons **168** are given to the individual. The individual loads coupons **168** into printer **54**. After the individual completes the health management program, printer **54** then prints valid identification field **170** on coupons **168**. Valid identification field **170**

validates coupons **168** and allows the individual to redeem them.

Fig. **14A** is a flow chart illustrating steps included in the monitoring application executed by server **42**. Fig. **14B** is a continuation of the flow chart of Fig. **14A**. In step **302**, server **42** determines if new script information has been entered through script entry screen **76**. If new script information has not been entered, server **42** proceeds to step **306**. If new script information has been entered, server **42** proceeds to step **304**.

As shown in Figs. **5A** and **5B**, the script information includes compliance questions, and for each of the compliance questions, corresponding responses choices. The script information also includes selected monitoring device type **50** from which to collect device measurements **64**. The script information further includes a prescribed connection time for each remote apparatus **48** to establish a subsequent communication link to server **42**. The script information is generally entered in server **42** by an administrator, such as an individual's healthcare provider. Of course, any person desiring to communicate with the patients may also be granted access to server **42** to create and assign customized compliance script programs **60**. Further, it is to be understood that system **40** may include any number of workstations **44** for entering script generation and script assignment information in server **42**.

In step **304**, script generator **70** generates customized health management script program **60** from the information entered in screen **76**. Customized health management script program **60** is stored in database **58**. Steps **302** and **304** are preferably repeated to generate multiple customized health management script programs **60**, e.g. a customized health management

script program **60** for diabetic individuals, a customized health management script program **60** for asthmatic individuals, etc. Each customized health management script program **60** corresponds to a respective one of the sets of compliance questions entered through script entry screen **76**.  
5 Following step **304**, server **42** proceeds to step **306**.

In step **306**, server **42** determines if new script assignment information has been entered through assignment screen **78**.  
10 If new script assignment information has not been entered, server **42** proceeds to step **310**. If new script assignment information has been entered, server **32** proceeds to step **308**. As shown in Fig. **7**, customized health management script programs **60** are assigned to each individual by selecting  
15 customized health management script program **60** through check boxes **142**, selecting the individuals to whom selected customized health management script program **60** is to be assigned through check boxes **144**, and pressing ASSIGN SCRIPT button **148**. When ASSIGN SCRIPT button **148** is pressed,  
20 script assignor **78** creates for each individual selected in check boxes **144** a respective pointer to customized health management script program **60** selected in check boxes **142**. In step **308**, each pointer is stored in look-up table **66** of database **58**. Following step **308**, server **42** proceeds to step  
25 **310**.

In step **310**, server **42** determines if any remote apparatuses **48** are connected to server **42**. Each individual to be monitored is preferably provided with his or her own remote  
30 apparatus **48** which has the individual's unique identification code stored therein. Each individual is thus uniquely associated with a respective one of remote apparatuses **48**. If none of remote apparatuses **48** are connected, server **42** proceeds to step **320**.

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If remote apparatus 48 is connected, server 42 receives from remote apparatus 48 the individual's unique identification code in step 312. In step 314, server 42 receives from remote apparatus 48 compliance answers 62, device measurements 64, and script identification code recorded during execution of a previously assigned customized health management script program 60. The script identification code identifies to server 42 which customized health management script program 60 was executed by remote apparatus 48 to record compliance answers 62 and device measurements 64. Compliance answers 62, device measurements 64, and script identification code are stored in database 58.

In step 316, server 42 uses the individual's identification code to retrieve from look-up table 66 the pointer to customized health management script program 60 assigned to the individual. Server 42 then retrieves customized health management script program 60 from database 58. In step 318, server 42 transmits customized health management script program 60 to the individual's remote apparatus 48 through communication network 46. Following step 318, server 42 proceeds to step 320.

In step 320, server 42 determines if a report request has been received from workstation 44. If no report request has been received, server 42 returns to step 302. If a report request has been received for a selected individual, server 42 retrieves from database 58 compliance answers 62 and device measurements 64 last received from the individual, as shown in step 322. In step 324, server 42 generates and displays report 80 on workstation 44. As shown in Fig. 13, report 80 includes compliance answers 62 and device measurements 64 last received from the individual. Following step 324, server 42 returns to step 302.

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Figs. 15A - 15C illustrate the steps included in customized health management script program 60 executed by remote apparatus 48. Before customized health management script program 60 is received, remote apparatus 48 is initially programmed with the individual's unique identification code and the script interpreter used by processor 98 to execute customized health management script program 60. The initial programming may be achieved during manufacture or during an initial connection to server 42. Following initial programming, remote apparatus 48 receives from server 42 customized health management script program 60 assigned to the individual associated with remote apparatus 48. Customized health management script program 60 is received by modem 102 through a first communication link and stored in memory 100.

In step 402, processor 98 assigns a script identification code to customized health management script program 60 and stores the script identification code in memory 100. The script identification code is subsequently transmitted to server 42 along with compliance question answers 62 and device measurements 64 to identify to server 42 which customized health management script program 60 was most recently executed by remote apparatus 48. In step 404, processor 98 lights LED 88 to notify the individual that he or she has unanswered compliance questions stored in remote apparatus 48. LED 88 preferably remains lit until all compliance questions are answered by the individual. In step 406, processor 98 erases from memory 100 the last set of answers 62 recorded.

In step 408, processor 98 prompts the individual by displaying on display 86 "ANSWER QUERIES NOW? PRESS ANY BUTTON TO START". In step 410, processor 98 waits until a reply to the prompt is received from the individual. When a

replay is received, processor 98 proceeds to step 412. In step 412, processor 98 executes successive display and input commands to display the compliance questions and response choices on display 86 and to receive answers 62 to the compliance questions.

Fig. 8 illustrate a sample compliance question and its corresponding response choices as they appear on display 86. The response choices are positioned on display 86 such that each response choice is located proximate a respective one of user input buttons 90A, 90B, 90C, and 90D. In the preferred embodiment, each response choice is displayed immediately above a respective user input button 90. The individual presses user input button 90 corresponding to his or her response 62. Processor 98 stores each answer 62 in memory 100.

In steps 414 - 418, processor 98 executes commands to collect device measurements 64 from selected monitoring device 50. Customized health management script program 60 specifies selected monitoring device 50 from which to collect device measurements 64. In step 414, processor 98 prompts the individual to connect selected monitoring device 50, for example a blood glucose meter, to device jack 94. A sample prompt is shown in Fig. 9. In step 416, processor 98 waits until a reply to the prompt is received from the individual. When a reply is received, processor 98 proceeds to step 418. In step 418, processor 98 collects device measurements 64 from monitoring device 50 through interface 108. Device measurements 64 are stored in memory 100.

In step 420, processor 98 determines whether or not the individual has met the evaluation criteria. Preferably, processor 98 sums device measurements 64 and comes up with a value. In step 422, processor 98 then determines the

maximum allowable value for the criteria. In step 424, processor 98 determines the minimum allowable value for the criteria. In step 426, processor compares the individual's value with the maximum and minimum allowable values. If the individual's value falls within the maximum and minimum values, processor determines that the criteria has been met and goes to step 428. In step 428, a congratulations message is shown on display 86 of remote apparatus 48. A sample congratulations message is shown in Fig. 10. Processor 98 then commands printer 54 to print coupon 82 for the compliant individual.

If the individual is not compliant and has not met the evaluation criteria, processor 98 goes to step 432. In step 432, processor 98 displays instructions for the individual on display 86 of remote apparatus 48. The instructions are intended to remind the individual what he or she must do in order to be considered compliant. A sample instruction message is shown in Fig. 11.

In step 434, processor 98 prompts the individual to connect remote apparatus 48 to telephone jack 104 so that remote apparatus 48 may connect to server 42 at the prescribed connection time. In step 436, processor 98 waits until a reply to the prompt is received from the individual. When a reply is received, processor 98 turns off LED 88 in step 438. In step 440, processor 98 waits until it is time to connect to server 42. Processor 98 compares the connection time specified in customized health management script program 60 to the current time output by clock 112. When it is time to connect, processor 98 connects to modem 102.

In step 442, processor 98 establishes a subsequent communication link between remote apparatus 48 and server 42 through modem 102 and communication network 46. If the

connection fails for any reason, processor **98** repeats step **442** to get a successful connection. In step **446**, processor **98** transmits compliance question responses **62**, device measurements **64**, script identification code, and the individual's identification code stored in memory **100** to server **42** through the subsequent communication link. In step **448**, processor **98** receives through modem **102** new customized health management script program **60** from server **42**. New customized health management script program **60** is stored in memory **100** for subsequent execution by processor **98**. Following step **448**, customized health management script program **60** ends.

Figs. **16 - 19** illustrate a second embodiment of the invention in which each remote apparatus has speech recognition and speech synthesis functionality. Fig. **16** shows a perspective view of a remote apparatus **49** according to the second embodiment. Remote apparatus **49** includes a speaker **164** for audibly communicating compliance questions and prompts to the individual. Remote apparatus **49** also includes a microphone **166** for receiving spoken responses to the compliance questions and prompts. Remote apparatus **49** may optionally include a display **86** for displaying prompts to the individual, as shown in Fig. **17**.

Fig. **19** is a schematic block diagram illustrating the components of remote apparatus **49** in greater detail. Remote apparatus **49** is similar in design to remote apparatus **48** of the preferred embodiment except that remote apparatus **49** includes an audio processor chip **172** in place of processor **98**. Audio processor chip **172** is preferably an RSC-164 chip commercially available from Sensory Circuits Inc. of 1735 N. First Street, San Jose, California 95112.

Audio processor chip **172** has a microcontroller **174** for  
executing customized health management script programs **60**  
received from server **48**. A memory **100** is connected to  
microcontroller chip **174**. Memory **100** stores customized  
5 health management script program **60**, and a script interpreter  
used by microcontroller chip **174** to execute customized health  
management script program **60**. Memory **100** also stores device  
measurements **64** received from monitoring device **50**, answers  
**62** to the compliance questions, script identification codes,  
10 and the individual's unique identification code.

Audio processor chip **172** also has built in speech synthesis  
functionality for synthesizing questions and prompts to a  
individual through speaker **164**. For speech synthesis, audio  
15 processor chip **172** includes a digital to analog converter  
(DAC) **192** and an amplifier **194**. DAC **192** and amplifier **194**  
drive speaker **164** under the control of microcontroller chip  
**174**.

20 Audio processor chip **172** further has built in speech  
recognition functionality for recognizing responses spoken  
into microphone **166**. Audio signals received through  
microphone **166** are converted to electrical signals and sent  
to a preamp and gain control circuit **178**. Preamp and gain  
25 control circuit **178** is controlled by an automatic gain  
control circuit (AGC) **186**, which is in turn controlled by  
microcontroller chip **174**. After being amplified by preamp  
**178**, the electrical signals enter microcontroller chip **174**  
and pass through a multiplexer **180** and an analog to digital  
30 converter (ADC) **182**. The resulting digital signals pass  
through a digital logic circuit **184** and enter microcontroller  
chip **174** for speech recognition.

Audio processor chip **172** also includes a RAM **188** for short  
35 term memory storage and a ROM **190** which stores customized

health management script program 60 executed by microcontroller chip 174 to perform speech recognition and speech synthesis. Audio processor chip 172 operates at a clock speed determined by a crystal 176. Audio processor chip 172 also includes a clock 112 which provides the current date and time to audio processor chip 172. As in the preferred embodiment, remote apparatus 49 includes an LED 88, display driver 106, modem 102, device interface 108, and printer interface 110, all of which are connected to microcontroller 174.

The operation of the second embodiment is similar to the operation of the preferred embodiment except that compliance questions, response choices, and prompts are audibly communicated to the individual through speaker 164 rather than being displayed to the individual on display 86. The operation of the second embodiment also differs from the operation of the preferred embodiment in that answers 62 to the compliance questions and prompts are received through microphone 166 rather than through user input buttons 90A, 90B, 90C, and 90D.

The customized compliance script programs of the second embodiment are similar to customized health management script program 60 shown in Figs. 6A - 6B, except that each display command is replaced by a speech synthesis command and each input command is replaced by a speech recognition command. The speech synthesis commands are executed by microcontroller 174 to synthesize the compliance questions, response choices, and prompts through speaker 164. The speech recognition commands are executed by microcontroller 174 to recognize answers 62 spoken into microphone 166.

For example, to ask an individual how he or she feels and record a response, microcontroller 174 first executes a

speech synthesis command to synthesize through speaker **164**  
"How do you feel? Please answer with one of the following  
responses: very bad, bad, good, or very good." Next,  
microcontroller **174** executes a speech recognition command to  
5 recognize the response spoken into microphone **166**. The  
recognized response is stored in memory **100** and subsequently  
transmitted to server **42**. Other than the differences  
described, the operation and advantages of the second  
embodiment are the same as the operation and advantages of  
10 the preferred embodiment described above.

A third embodiment of the present invention is illustrated in  
Figs. **20 - 26**. This embodiment encompasses a number of  
features. One feature asks individuals compliance questions,  
15 another feature receives device measurements **64** from device  
monitor **50**, and a third feature allows an administrator to  
select an educational program to be broadcast to the  
individual. The individual must satisfy the evaluation  
criteria for all three features in order to be considered  
20 compliant. If he or she is deemed compliant, a coupon is  
printed out.

Fig. **20** shows the system comprising a server **42**, a  
workstation **44**, and an individual station **197**. All three  
25 components of the system are connected via a communication  
network **46**. Individual station **197** comprises a multimedia  
processor **196** which has attached to it a display unit **198**.  
Display unit **198** can be any sort of device which presents  
audiovisual signals, such as a television. Multimedia  
30 processor **196** also has attached to it monitoring device **50**  
and coupon printer **54**. Both monitoring device **50** and coupon  
printer **54** work in the same manner as described in the first  
embodiment.



Fig. 21 shows server 42 in greater detail. Server 42 includes a database 58 for storing health management script programs 60. Customized health management script programs 60 are executed by multimedia processor 196 to communicate compliance questions to the individual, receive answers 62 to the questions, display an educational program 202, receive responses 206 to educational program 202, collect monitoring device measurements 64, and transmit answers 62 and measurements 64 to server 42. Database 58 is also designed to store answers 62 and measurements 64. Database 58 further includes a look-up table 66. Table 66 contains a list of the individuals participating in the compliance program, and for each individual, a unique identification code and a respective pointer to customized health management script programs 60 assigned to the individual.

Database 58 also includes plan specifications 204 for use by the administrator. Plan specifications 204 allow the administrator to design a plan for an individual. Thus plan specifications 204 provide customized compliance programs for each individual. The plan specification screen 205 is shown in Fig. 23. Plan specification screen 205 includes a plan name field 116, which allows the administrator to name the plan. Plan specification screen 205 also includes fields 118 for compliance questions. Compliance questions can be entered by the administrator to ask the individual how he or she is faring with the compliance program.

The compliance questionnaire 198 which is generated from the compliance questions entered on plan specification screen 205 is shown in Fig. 25. Compliance questionnaire 198 comprises questions about how successfully the individual has followed his or her compliance program. Compliance questionnaire 198 also comprises responses 206 to the compliance questions. The individual can enter in his or her best responses 206 to

the compliance questions via multimedia processor **196**. Answers **206** are then evaluated and eventually sent to server **42**.

5 Referring back to Fig. **23**, plan specification screen **205** also includes check boxes **124** for selecting the type of monitoring device **50** which the individual should connect to multimedia processor **196** in order to transmit device measurements **64** to server **42**. Plan specification screen **205** further comprises  
10 check boxes **222** for selecting the educational program **202** for the individual to view. Educational program **202** ideally corresponds with the compliance questions and the monitoring device **50**. For example, if the compliance questions are aimed at diabetic individuals and monitoring device **50** is a  
15 blood glucose meter, educational program **202** will be on diabetes.

In addition, plan specification screen **205** also displays evaluation criteria. Each evaluation criterion has a check  
20 box **126** which can be selected. More than one evaluation criterion can be selected for each customized health management script program **60**. Each evaluation criterion also has a value entry field **128** where the value the individual needs to meet for each criterion can be manually entered.

25 Plan specification screen **205** also includes check boxes **130** for selecting the type of coupon to be delivered to the individual if he or she satisfies the evaluation criteria. Ideally, the coupon type will correspond to the type of  
30 health management script program **60** assigned to the individual. For example, if the individual is a diabetic, he or she can receive a coupon for a sugar-free frozen yogurt, to be redeemed at participating retailers.

The other features of plan specification screen **205** are a monitoring interval field **134** for determining how often the individual should respond to the monitoring plan, an OK button **224** which is used to save the information entered into plan specification screen **205**, and a CANCEL button **226** to erase the information entered into plan specification screen **205**.

Referring back to Fig. **21**, server **42** includes a monitoring application **200**. Monitoring application **200** is a controlling software application executed by server **42** to perform the various functions described below. Monitoring application **200** includes a plan generator **71**, a plan assignor **73**, and a report generator **74**. Plan generator **70** is designed to generate plan specifications **204** from information entered through plan specification screen **205**. Server **42** also includes educational programs **202** which are sent to multimedia processor **196** to be displayed on display unit **198** for the individual to view.

Fig. **22** shows a detailed block diagram of multimedia processor **196**. Multimedia processor **196** is designed to execute assigned customized compliance plan specifications **204** which it receives from server **42**. Multimedia processor **196** has a computer processing unit (CPU) **98** which is connected to a memory **100**. Memory **100** is preferably a non-volatile memory, such as a serial EEPROM. Memory **100** stores customized compliance plan specifications **204** from server **42**, as well as the individual's answers **62**, answers **206**, and device measurements **64** to be sent to server **42**. CPU **98** is preferably connected to memory **100** using a standard two-wire I<sup>2</sup>C interface.

CPU **98** is also connected to printer interface **110**, which transmits information to printer **54** through printer jack **96**,

and device interface **108**, which transmits data from monitoring device **50** through device jack **94**. The data includes compliance questionnaires, educational programs, the individual's answers and responses, and coupon information to be printed on printer **54**. CPU **98** is also connected to device interface **108** which connects monitoring device **50** through device jack **94**. Measurements **64** from monitoring device **50** are uploaded into CPU **98**, where they are then transmitted to server **42**. CPU **98** is further connected to modem **102**, which is used to connect multimedia processor **196** to server **42** through communication network **42**. Modem **102** is connected to telephone jack **104** through modem jack **96**.

CPU **98** is also connected to a video/text generator **208**. Video/text generator **208** is for receiving and processing educational programs **202** from the CPU and displaying them on display unit **198** to be viewed and heard by the individual. Alternatively, the educational programs can be received using a tuner **212**, which is also connected to CPU **98**. Tuner **212** receives signals of different frequencies from a broadcast source **214**, such as the transmitter of a television station. Tuner **212** translates these signals into educational programs **202** which can be viewed and heard by the individual on display unit **198**. Both video/text generator **208** and tuner **212** are connected to a CMOS switch **210**, which is also connected to CPU **98**. CMOS switch **210** alternatively connects video/text generator **208** and tuner **212** to CPU **98**.

Finally, CPU **98** is connected to a control receiver **216**. Control receiver **206** is for receiving signals from a remote control **218**. Remote control **218** is a standard wireless signal producer which can be used by the individual to send commands to CPU **98** from a distance. Signals generated by remote control **218** are received by control receiver **216** and sent to CPU **98** to be carried out.

Referring back to Fig. 21, workstation 44 connected to server 42 includes plan specification entry screen 205, a plan assignment screen 228, and report screen 80. Plan assignment screen 228 is illustrated in greater detail in Fig. 24. Plan assignment screen 228 comprises check boxes 230 for each of the available plans. Plan assignment screen 228 also comprises check boxes 232 for selecting the individual to whom the plan is to be assigned. After the assignment has been made, the ASSIGN PLAN button 236 is selected to create and store for the individual selected in check boxes 232 a respective pointer to the plan selected in check boxes 230. Each pointer is stored in look-up table 66 of database 58. Plan assignment screen 228 further includes an ADD PLAN button 234 for accessing plan specification screen 205 and a DELETE PLAN button 238 for deleting a plan specification.

The operation of this embodiment is shown in Figs. 26A and 26B. Fig. 26A is a flow chart illustrating steps included in the monitoring application executed by server 42. Fig. 26B is a continuation of the flow chart of Fig. 26A. In step 502, server 42 determines if new plan information has been entered through plan specification screen 205. If new plan information has not been entered, server 42 proceeds to step 506. If new script information has been entered, server 42 proceeds to step 504.

As shown in Fig. 23, plan specification screen 205 includes compliance questions, monitoring devices 50 to be selected, educational programs to be selected, evaluation criteria to be set, and coupon types to be selected. Plan specification screen 205 further includes a prescribed connection time for multimedia processor 196 to establish a subsequent communication link to server 42. The plan information is generally entered in server 42 by an administrator, such as a

healthcare provider. Of course, any person desiring to communicate with the individuals may also be granted access to server **42** to create and assign plans. Further, it is to be understood that the system may include any number of  
5 workstations **44** for entering plan generation and plan assignment information in server **42**.

In step **504**, plan generator **71** generates a plan specification from the information entered in plan specification screen  
10 **205**. Plan specification **204** is stored in database **58**. Steps **502** and **504** are preferably repeated to generate multiple plan specifications **204**, e.g. plans for diabetic individuals, plans for asthmatic individuals, etc. Following step **504**, server **42** proceeds to step **506**.

15 In step **506**, server **42** determines if new plan assignment information has been entered through plan assignment screen **228**. If new plan assignment information has not been entered, server **42** proceeds to step **510**. If new plan  
20 assignment information has been entered, server **42** proceeds to step **508**. In step **508**, each pointer generated on plan assignment screen **228** is stored in look-up table **66** of database **58**. Following step **508**, server **42** proceeds to step **510**.

25 In step **510**, server **42** determines if a report request has been received from workstation **44**. If no report request has been received, server **42** goes to step **516**. If a report request has been received for a selected individual, server  
30 **42** retrieves from database **58** responses **62**, answers **206**, and device measurements **64** last received from the individual in step **512**. In step **514**, server **42** generates and displays the individual's report on workstation **44**. Following step **514**, the server goes to step **516**.

35

In step **516**, server **42** determines if any multimedia processors **196** are remotely connected to server **42**. Each individual to be monitored is preferably provided with his or her own multimedia processor **196** which has the individual's  
5 unique identification code stored therein. Each individual is thus uniquely associated with a respective one of the multimedia processors **196**. If none of the multimedia processors **196** are connected, server **42** returns to step **502**.

10 If multimedia processor **196** is connected, server **42** receives from multimedia processor **196** the individual's unique identification code in step **518**. In step **520**, server **42** receives from multimedia processor **196** responses **62**, answers **206**, device measurements **64**, and plan identification code  
15 recorded during execution of a previously assigned plan. The plan identification code identifies to server **42** which plan was executed by multimedia processor **196** to record answers **62**, responses **206**, and device measurements **64**. The answers **62**, responses **206**, device measurements **64**, and plan  
20 identification code are stored in database **58**.

In step **522**, server **42** uses the individual's identification code to retrieve from look-up table **66** the pointer to plan specification **204** assigned to the individual. Server **42**  
25 then retrieves assigned plan specification **204** from database **58**. Server **42** transmits assigned plan specification **204** to the individual's multimedia processor **196** through communication network **46**. Following step **522**, server **42** proceeds to step **524**.

30 In steps **524** and **526**, multimedia processor **196** executes commands to collect device measurements **64** from a selected monitoring device **50**. Plan specification **204** determines the selected monitoring device **50** from which to collect device  
35 measurements **64**. In step **524**, multimedia processor **196**

prompts the individual to connect selected monitoring device 50, for example a blood glucose meter, to device jack 94. In step 526, multimedia processor 196 collects device measurements 64 from monitoring device 50 through device interface 108. Device measurements 64 are stored in memory 100.

In step 528, multimedia processor 196 determines whether plan specification 204 indicates educational program 202 should be shown on display 198. If not, multimedia processor 196 goes directly to step 534. If educational program 202 has been specified, multimedia processor 196 goes to step 530. In step 530, multimedia processor 196 receives the educational program via modem 102 or tuner 212. The educational program is then processed and displayed on display unit 198. In step 532, the individual uses remote control 218 to respond to educational program 202. Answers 62 are sent from multimedia processor 196 to server 42 where they are stored on database 58.

Next is step 534, where multimedia processor 196 calculates if the individual has met the evaluation criteria which determines his or her compliance status. If the individual is deemed compliant, display 198 shows a congratulations message, in step 536. An example of a congratulations message is shown in Fig. 10. Multimedia processor 196 then directs coupon printer 54 to print coupon 82 for the individual. An example of coupon 82 is shown in Fig. 12.

If the individual is deemed uncompliant, multimedia processor 196 goes to step 540 and displays instructions for the individual to follow in order to become compliant. Example instructions are shown in Fig. 11. At this time, multimedia processor 196 goes back to step 502 and repeats the sequence.



Another embodiment of the present invention is shown in Figs. 27 - 29. This system is an automated telephone monitoring system which regularly calls individuals who are participating in the compliance program. Compliant patients receive credit in their own account 252 set up at a participating store 250. The system comprises a server 42, an individual station 245, and participating store 250. Individual stations 245 comprise a DTMF telephone which can be connected to a monitoring device 50 by a communication means 248, such as a standard cable connection.

Fig. 27 shows a detailed block diagram of the system. Server 42 communicates with individual station 245 through a digital/tone signal converter 244. The purpose of digital/tone signal converter 244 is to convert electronic signals generated by the monitoring application 240 into recognizable sounds to be heard by the individual. The electronic signals generated by monitoring application 240 correspond to plan specification 204 generated by plan generator 73.

Server 42 includes a database 58, which stores plan specifications 204, the individual's responses 62 to compliance questions entered on plan specifications 204, device measurements 64, and a look-up table 66. Plan specifications 204 allow the administrator to design a plan for an individual. Thus plan specifications 204 provide customized compliance programs for each individual. The plan specification screen 207 for this embodiment is shown in Fig. 28. Note that plan specification screen 207 of Fig. 28 is similar to plan specification screen 205 of Fig. 23. The plan name field 116, the compliance question fields 118, the check boxes 124 for selecting a monitoring device 50, the check boxes 126 for selecting evaluation criteria, the

monitoring interval field **134**, the OK button **224**, and the CANCEL button **226** all have the same function as in plan specification screen **205** of Fig. **23**. However, plan specification screen **207** of Fig. **28** also has check boxes **254**  
5 for selecting reward account **252** at participating store **250**.

Referring back to Fig. **27**, monitoring application **240** includes a plan generator **71**, a plan assignor **73**, and a report generator **74**. All three components of monitoring  
10 application **240** have the same functions as their counterparts in the previous embodiments.

The operation of this embodiment is shown in Figs. **29A** and **29B**. Fig. **29A** is a flow chart illustrating steps included  
15 in monitoring application **240** executed by server **42**. Fig. **29B** is a continuation of the flow chart of Fig. **29A**. In step **602**, server **42** determines if new plan information has been entered through plan specification screen **207**. If new plan information has not been entered, server **42** proceeds to  
20 step **606**. If new script information has been entered, server **42** proceeds to step **604**.

In step **604**, plan specification **204** is generated from plan specification screen **207** and is stored in database **58**. Steps  
25 **602** and **604** are preferably repeated to generate multiple plans, e.g. plans for diabetic individuals, plans for asthmatic individuals, etc. Following step **604**, server **42** proceeds to step **606**.

In step **606**, server **42** determines if new plan assignment information has been entered through plan assignment screen  
30 **228**. Plan assignment screen **228** is the same as that used in the previously described embodiment and shown in Fig. **24**. If new plan assignment information has not been entered, server  
35 **42** proceeds to step **610**. If new plan assignment information

has been entered, server **42** proceeds to step **608**. In step **608**, each pointer generated on plan assignment screen **228** is stored in look-up table **66** of database **58**. Following step **608**, server **42** proceeds to step **610**.

5

In step **610**, server **42** determines if a report request has been received from workstation **44**. If no report request has been received, server **42** goes to step **616**. If a report request has been received for a selected individual, server **42** retrieves from database **58** answers **62** and device measurements **64** last received from the individual in step **612**. In step **614**, server **42** generates and displays the individual's report on workstation **44**. Following step **614**, the server goes to step **616**.

15

In step **616**, server **42** determines if it is time to call the individual, as determined by the information entered into plan specification screen **207**. If it is not time, server **42** returns to step **602**. If it is time to call, server **42** proceeds to step **618**. In step **618**, server **42** calls the individual through the use of automated call processor **242**. Compliance questions and prompts entered into plan assignment screen **207** are translated into recognizable sounds and sent via digital/tone signal converter **244** to individual's DTMF telephone **246**.

25

In step **620**, the individual hears the compliance questions. The individual responds to the compliance questions and answers **62** are sent back through digital/tone signal converter **244** to automated call processing **242** of server **42**. Responses **62** are then stored in database **58**.

30

In steps **622** and **624**, server **42** executes commands to collect device measurements **64** from a selected monitoring device **50**. Plan specification **204** determines the selected monitoring

35

device 50 from which to collect device measurements 64. In step 524, server 42 prompts the individual to connect selected monitoring device 50, for example a blood glucose meter, to a device jack of DTMF telephone 246 via communication link 248. Device measurements 64 are stored in database 58.

Next is step 626, where server 42 calculates if the individual has met the evaluation criteria which determines his or her compliance status. If the individual is deemed compliant, server 42 credits individual's account 252 in participating store 250 in step 630. There are a number of ways in which server 42 can credit account 252. If server 42 and account 252 are connected by a communication means, the credit can be automatically sent over. If server 42 and account 252 are not connected by a communication means, server 42 can print out a credit sheet to be sent to participating store 250, where credit can be manually entered into account 252.

If the individual is deemed uncompliant, server 42 goes to step 632 and displays instructions for the individual to follow in order to become compliant. At this time, server 42 goes back to step 602 and repeats the sequence.

A last embodiment of the present invention is shown in Figs. 30 and 31. This embodiment makes use of a memory card 258 which provides communication means between the administrator's workstation 45 and the individual's multimedia processor 197. Memory card 258 contains a magnetic strip or electronic circuit which stores information.

Fig. 30 shows a detailed block diagram of administrator workstation 45 and multimedia processor 197. Administrator

workstation 45 comprises a database 58, which includes customized health management script programs 60, the individual's responses 62 to compliance questions in customized health management script programs 60, and device measurements 64. Monitoring application 68 is a controlling software application executed by server 42 to perform the various functions described below. Monitoring application 68 includes a script generator 70, a script assignor 72, and a report generator 74. Script generator 70 is designed to generate customized compliance script programs 60 from script information entered through workstation 44. Report generator 74 is for creating reports 80 from answers 62 and device measurements 64 to be displayed on workstation 45 for the administrator to view.

Workstation 45 also comprises a memory card reader/writer 256. Memory card reader/writer 256 is used by the administrator to store customized compliance script programs 60 on memory card 258. Memory card 258 is then given to the individual, who takes it and places it in the memory card reader/writer 260 of his or her multimedia processor 197.

Multimedia processor 197 of this embodiment is similar to multimedia processor 196 described above. Multimedia processor 197 is designed to execute assigned customized compliance script programs 60 which it receives from workstation 45. Multimedia processor 197 has a computer processing unit (CPU) 98 which is connected to a memory 100. Memory 100 is preferably a non-volatile memory, such as a serial EEPROM. Memory 100 stores customized health management script programs 60 from workstation 45, as well as the individual's answers 62, responses 206, and device measurements 64 to be sent to workstation 45. CPU 98 is preferably connected to memory 100 using a standard two-wire I<sup>2</sup>C interface. CPU 98 is also connected to device interface

108 which connects monitoring device 50 through device jack 94. Measurements 64 from monitoring device 50 are uploaded into CPU 98, where they are then transmitted to workstation 45.

5 CPU 98 is further connected to a video/text generator 208. Video/text generator 208 is for receiving and processing the educational programs from the CPU and displaying them on display unit 198 to be viewed and heard by the individual. 10 Alternatively, the educational programs can be received using a tuner 212, which is also connected to CPU 98. Tuner 212 receives signals of different frequencies from a broadcast source 214, such as the transmitter of a television station. Tuner 212 translates these signals into educational programs 15 202 which can be viewed and heard by the individual on display unit 198. Both video/text generator 208 and tuner 212 are connected to a CMOS switch 210, which is also connected to CPU 98. CMOS switch 210 alternatively connects video/text generator 208 and tuner 212 to CPU 98.

20 Finally, CPU 98 is connected to a control receiver 216. Control receiver 216 is for receiving signals from a remote control 218. Remote control 218 is a standard wireless signal producer which can be used by the individual to 25 command CPU 98 from a distance. Signals generated by remote control 218 are received by control receiver 216 and sent to CPU 98 to be carried out.

Fig. 31 illustrates the steps carried out by customized 30 health management script programs 60. Customized health management script program 60 begins when memory card 258 which stores customized health management script program 60 is placed in memory card reader/writer 260 of multimedia processor 197. In step 702, customized health management 35 script program 60 first displays compliance questions on

display unit **198** for the individual to view or hear. The individual responds to the compliance questions using remote control **218**. Individual's responses **62** are sent from CPU **98** to workstation **45**.

5

In steps **704** and **706**, customized health management script program **60** commands the collection of device measurements **64** from selected monitoring device **50**. Customized health management script program **60** determines the selected  
10 monitoring device **50** from which to collect device measurements **64**. In step **704**, customized health management script program **60** prompts the individual to connect selected monitoring device **50**, for example a blood glucose meter, to a device jack **94** of multimedia processor **197**. Device  
15 measurements **64** are stored in database **58** on workstation **45** in step **706**.

Next is step **708**, where customized health management script program **60** calculates if the individual has met the  
20 evaluation criteria which determines his or her compliance status. If the individual is deemed compliant, customized health management script program **60** displays a congratulatory message on display unit **198** of multimedia processor **197** in step **712**. Customized health management script program **60**  
25 also credits individual's memory card **258** in step **714**. The credit can be redeemed in a number of ways. For example, a participating store can use a memory card reader/writer to read memory card **258** and give the individual a discount on a product.

30

If the individual is deemed uncompliant, customized health management script program **60** goes to step **716** and displays instructions for the individual to follow in order to become compliant. In the last step **718**, the individual's answers

62, device measurements 64, and compliance status are stored on memory card 258.

#### **SUMMARY, RAMIFICATIONS, AND SCOPE**

5 Although the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but merely as illustrations of some of the presently preferred embodiments. It should be noted that  
10 different components of each of the described embodiments can be combined in many ways. For example, the memory card could be use with the interactive telephone system.

Therefore, the scope of the invention should be determined not by the examples given but by the appended claims and  
15 their legal equivalents.



## CLAIMS

What is claimed is:

- 1 1. A computerized reward system for encouraging an  
2 individual to participate in a customized health  
3 management program, said system comprising:
  - 4 a) a monitoring means for collecting compliance data  
5 indicative of said individual's compliance with said  
6 customized health management program;
  - 7 b) a memory means for storing said compliance data and  
8 evaluation criteria;
  - 9 c) an evaluation means for comparing said compliance data  
10 to said evaluation criteria to determine a compliance  
11 status of said individual; and
  - 12 d) a reward dispensing means in communication with said  
13 evaluation means for dispensing a reward to said  
14 individual according to said compliance status;
  - 15 e) a script generating means for generating a customized  
16 health management script from a plurality of  
17 questions;
  - 18 f) a script assigning means for assigning said customized  
19 health management script to said individual.
- 20  
1 2. The system of claim 1, wherein said memory means  
2 further stores compliance instructions and said system  
3 further comprises user interface means connected to  
4 said memory means for communicating said compliance  
5 instructions to said individual.  
6  
1 3. The system of claim 2, wherein said compliance  
2 instructions include a description of at least one  
3 action said individual must perform to satisfy  
4 said evaluation criteria.  
5

- 1 4. The system of claim 1, wherein said monitoring means  
2 comprises a display means for displaying said  
3 compliance questions to said individual, and a user  
4 input device in communication with said display means  
5 for entering said individual's answers.  
6
- 1 5. The system of claim 1, wherein said monitoring means  
2 comprises a speech synthesis means for synthesizing  
3 said compliance questions, and a speech recognition  
4 means for recognizing said individual's answers.  
5
- 1 6. The system of claim 1, wherein said monitoring means  
2 is an interactive telephone call comprising a  
3 telephone and an automated call processing means  
4 connected to said telephone for asking said compliance  
5 questions and for receiving said individual's answers.  
6
- 1 7. The system of claim 1, wherein said compliance data  
2 further comprises responses to an interactive  
3 educational program, said monitoring means comprises a  
4 program display means for displaying said educational  
5 program to said individual, and a user input device in  
6 communication with said program display means for  
7 entering in said individual's responses.  
8
- 1 8. The system of claim 1, further comprising:  
2 a) a database in communication with said monitoring  
3 means and said evaluation means for storing said  
4 compliance data and said compliance status of said  
5 individual; and  
6 b) a display means connected to said database for  
7 displaying said compliance data and said  
8 compliance status.  
9

1 9. The system of claim 1, wherein said reward comprises a  
2 coupon and said reward dispensing means comprises a  
3 printer for printing said coupon.  
4

1 10. The system of claim 1, wherein said reward comprises a  
2 validated coupon and said reward dispensing means  
3 comprises a printer for validating a pre-printed  
4 coupon.  
5

1 11. The system of claim 1, wherein said reward comprises  
2 an electronic reward credited to a data card.  
3

1 12. The system of claim 1, wherein said reward comprises  
2 an electronic reward credited to an account.  
3

1 13. A method for encouraging an individual to participate in  
2 a customized health management program, said method  
3 comprising the following steps:  
4 a) generating a customized health management script from  
5 a plurality of questions; and  
6 b) assigning said customized health management script to  
7 said individual;  
8 c) collecting in a monitoring system compliance data  
9 indicative of said individual's compliance with said  
10 customized health management program;  
11 d) storing in said monitoring system evaluation criteria;  
12 e) comparing said compliance data to said evaluation  
13 criteria to determine a compliance status of said  
14 individual; and  
15 f) dispensing a reward to said individual according to  
16 said compliance status.  
17

1 14. The method of claim 13, further comprising the step of  
2 communicating compliance instructions to said  
3 individual.



7

1

21. The method of claim 13, wherein said reward comprises  
a coupon, and said step of dispensing said reward  
comprises printing said coupon.

4

1

22. The method of claim 13, wherein said reward comprises  
a validated coupon, and the step of dispensing said  
reward comprises validating a pre-printed coupon.

2

3

4

1

23. The method of claim 13, wherein said reward comprises  
an electronic reward, and the step of dispensing said  
reward comprises crediting the electronic reward to a  
data card.

2

3

4

5

1

24. The method of claim 13, wherein said reward comprises  
an electronic reward, and the step of dispensing said  
reward comprises crediting the electronic reward to a  
an account.

2

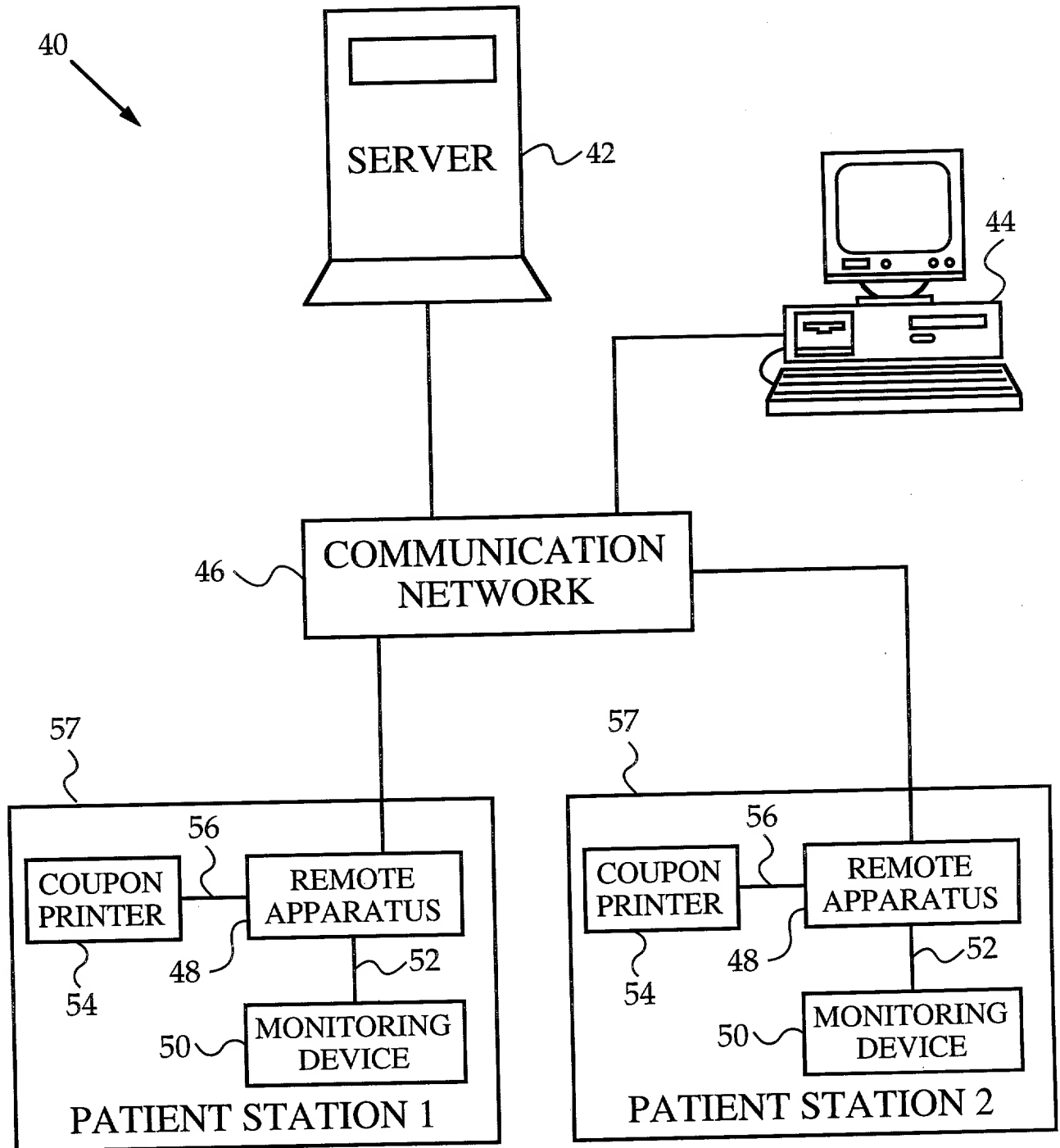
3

4

5

**Computerized Reward System For Encouraging  
Participation In A Health Management Program  
ABSTRACT**

5 A computerized reward system which encourages an individual's  
participation in a health management system includes a script  
generating means for generating a health management script, a  
script assignment means for assigning a health management  
10 data on the individual's compliance, a memory means for  
storing the compliance data, an evaluation means for  
comparing the compliance data to evaluation criteria to  
determine if the patient is compliant, and a reward to be  
given to the compliant individual. The individual's  
15 compliance is evaluated by his or her answers to the health  
management script. Each health management script program can  
be custom made for each individual. The different monitoring  
means possible which the individual can use include a  
remotely programmable apparatus, an interactive telephone  
20 call, and a multimedia processor. The rewards include a  
coupon and an electronic reward credited to the individual's  
data card or personal account at a store.



**FIG. 1**

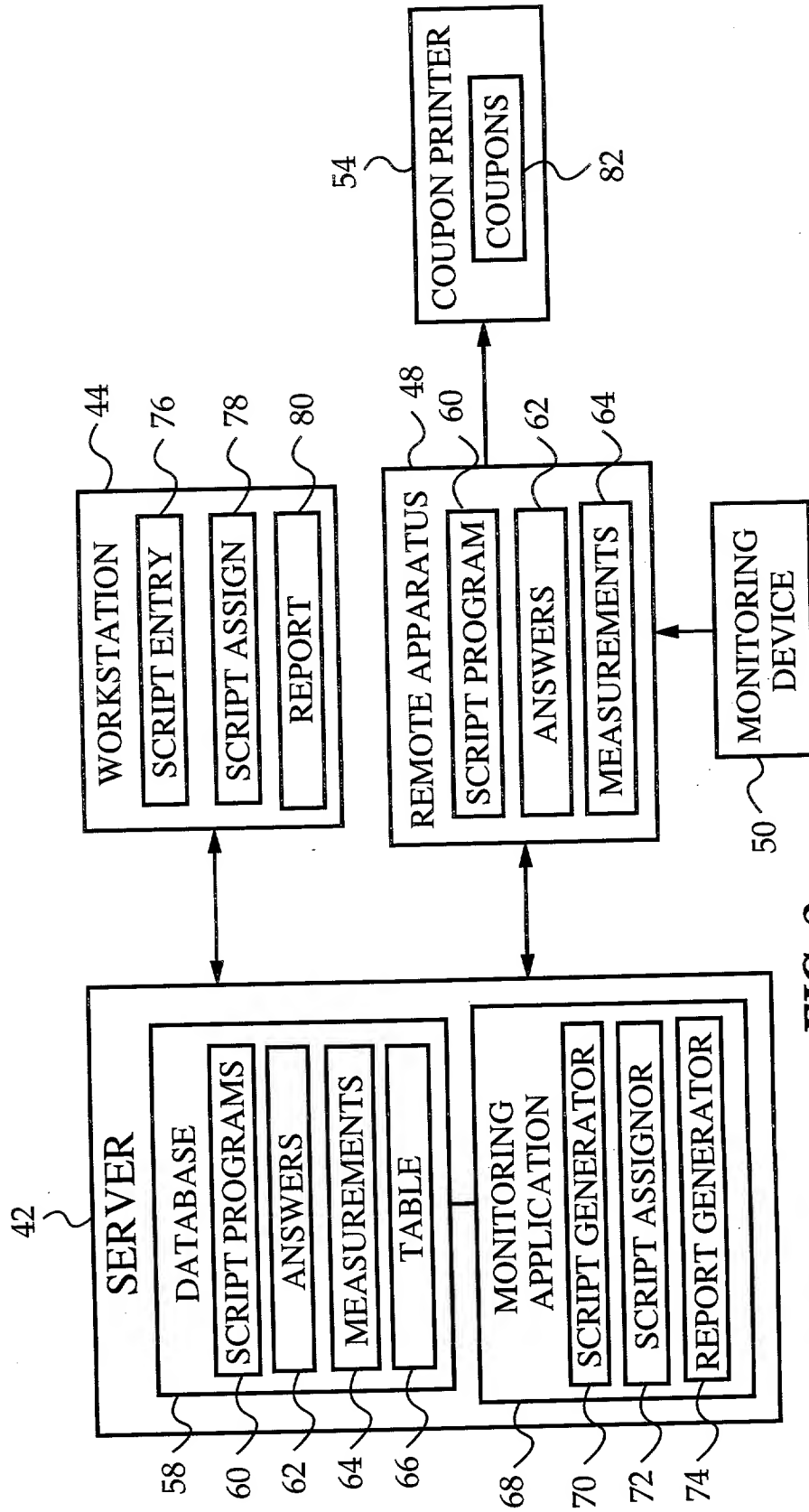


FIG. 2



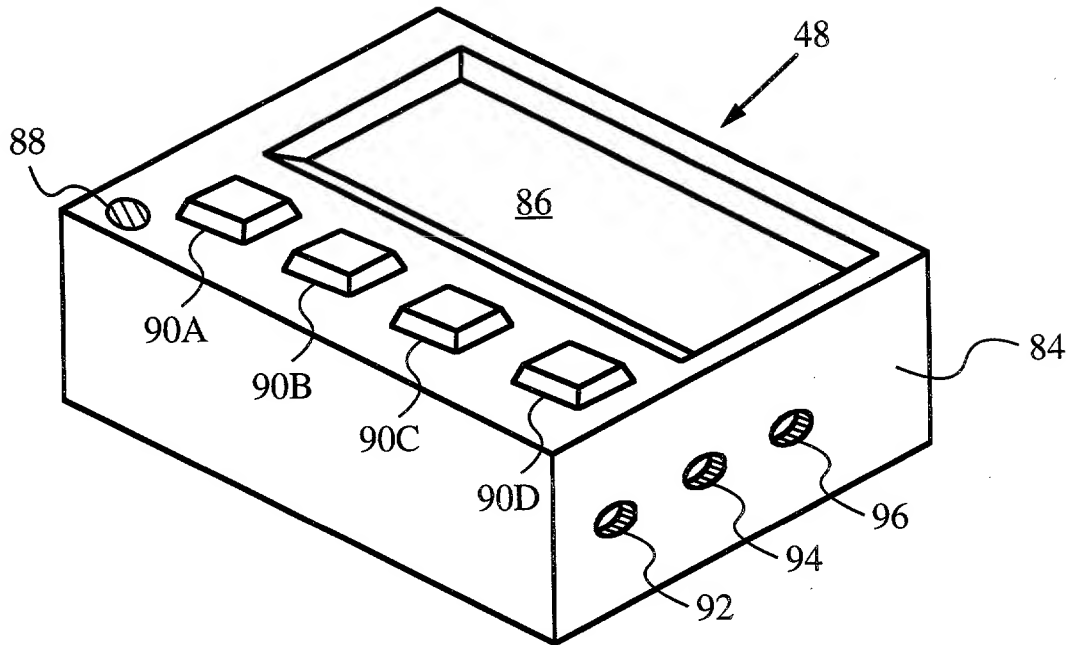


FIG. 3

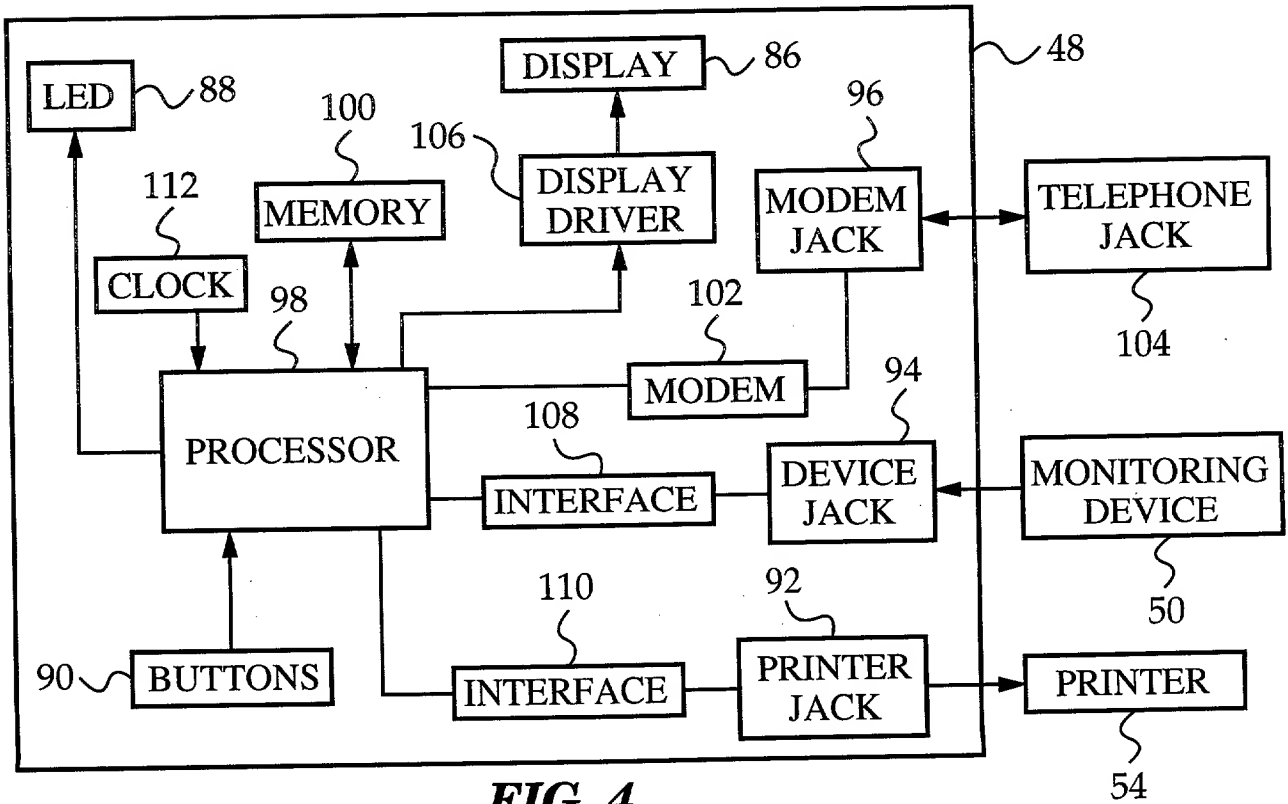


FIG. 4

## SCRIPT ENTRY SCREEN

SCRIPT NAME: DIABETES SCRIPT 1

116

COMPLIANCE QUESTIONS

CHOICE 1

CHOICE 2

CHOICE 3

CHOICE 4

HOW WELL ARE YOU FOLLOWING YOUR TREATMENT PLAN?	VERY BADLY	BADLY	WELL	VERY WELL
HOW MANY HYPOGLYCEMIC EPISODES HAVE YOU HAD IN THE PAST WEEK?	0	1	2	> 2
HOW MANY HYPERGLYCEMIC EPISODES HAVE YOU HAD IN THE PAST WEEK?	0	1	2	> 2
DID YOU TEST YOUR BLOOD SUGAR BEFORE BREAKFAST THIS MORNING?	YES	NO		
DID YOU EXERCISE TODAY?	YES	NO		

NEXT PAGE

**FIG. 5A**



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NUMBER: 9001 {LF}

LED: 1 {LF}

ZAP: {LF}

CLS: {LF}

DISPLAY: ANSWER QUERIES NOW?  
PRESS ANY BUTTON TO START {LF}

WAIT: {LF}

CLS: {LF}

DISPLAY: HOW WELL ARE YOU FOLLOWING  
YOUR TREATMENT PLAN?  
VERY VERY  
WELL BADLY WELL WELL {LF}

INPUT: OOOO {LF}

CLS: {LF}

DISPLAY: HOW MANY HYPOGLYCEMIC EPISODES  
HAVE YOU HAD IN THE PAST WEEK?

0 1 2 > 2 {LF}

INPUT: OOOO {LF}

CLS: {LF}

DISPLAY: HOW MANY HYPERGLYCEMIC EPISODES  
HAVE YOU HAD IN THE PAST WEEK?

0 1 2 > 2 {LF}

INPUT: OOOO {LF}

CLS: {LF}

DISPLAY: DID YOU TEST YOUR BLOOD SUGAR  
BEFORE BREAKFAST THIS MORNING?

YES NO {LF}

INPUT: OOX {LF}

CLS: {LF}

DISPLAY: DID YOU EXERCISE TODAY?

YES NO {LF}

**FIG. 6A**

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INPUT: OOX {LF}

CLS: {LF}

DISPLAY: CONNECT GLUCOSE METER  
AND PRESS ANY BUTTON  
WHEN FINISHED {LF}

WAIT: {LF}

CLS: {LF}

DISPLAY: COLLECTING MEASUREMENTS {LF}

COLLECT: GLUCOSE\_METER {LF}

CLS: {LF}

COUNT: {LF}

MAX: {LF}

MIN: {LF}

IF MAX\_VALUE < 320 AND MIN\_VALUE > 60 AND NUMBER > 2  
THEN PRINT: YOGURT {LF}

DISPLAY: CONGRATULATIONS,  
YOU ARE IN COMPLIANCE!  
KEEP UP THE GOOD WORK! {LF}

ELSE DISPLAY: YOU ARE NOT IN COMPLIANCE.  
YOU MUST MEASURE YOUR BLOOD  
SUGAR 2 TIMES PER DAY AND KEEP IT  
BETWEEN 60 AND 320 MG/DL {LF}

CLS: {LF}

DISPLAY: CONNECT APPARATUS TO  
TELEPHONE JACK AND  
PRESS ANY BUTTON  
WHEN FINISHED {LF}

WAIT: {LF}

LED: 0 {LF}

CLS: {LF}

DELAY: 03:00 {LF}

CONNECT: {LF}

{EOF}

**FIG. 6B**

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**SCRIPT ASSIGNMENT SCREEN**

AVAILABLE SCRIPTS:	PATIENTS:
<input checked="" type="checkbox"/> <u>DIABETES SCRIPT 1</u>	<input checked="" type="checkbox"/> <u>DAN LINDSEY</u>
<input type="checkbox"/> <u>DIABETES SCRIPT 2</u>	<input type="checkbox"/> <u>MARK SMITH</u>
<input type="checkbox"/> <u>ASTHMA SCRIPT 1</u>	<input type="checkbox"/> <u>DEAN JONES</u>

142      144      148      150

146      ADD SCRIPT      ASSIGN SCRIPT      DELETE SCRIPT

**FIG. 7**

48      86

HOW WELL ARE YOU FOLLOWING  
YOUR TREATMENT PLAN?

VERY BADLY	BADLY	WELL	VERY WELL
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

90A      90B      90C      90D

**FIG. 8**

48      86

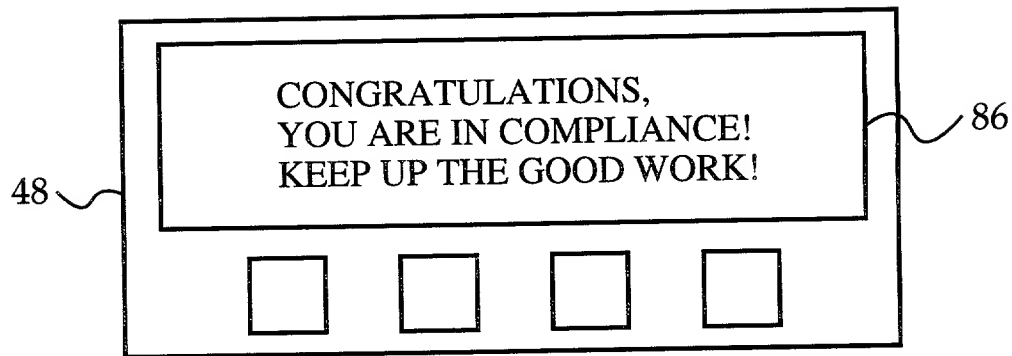
CONNECT GLUCOSE METER  
AND PRESS ANY BUTTON  
WHEN FINISHED

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

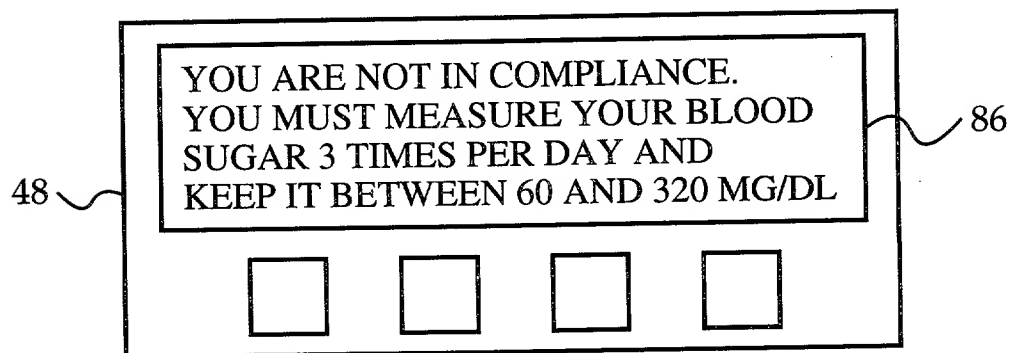
90A      90B      90C      90D

**FIG. 9**

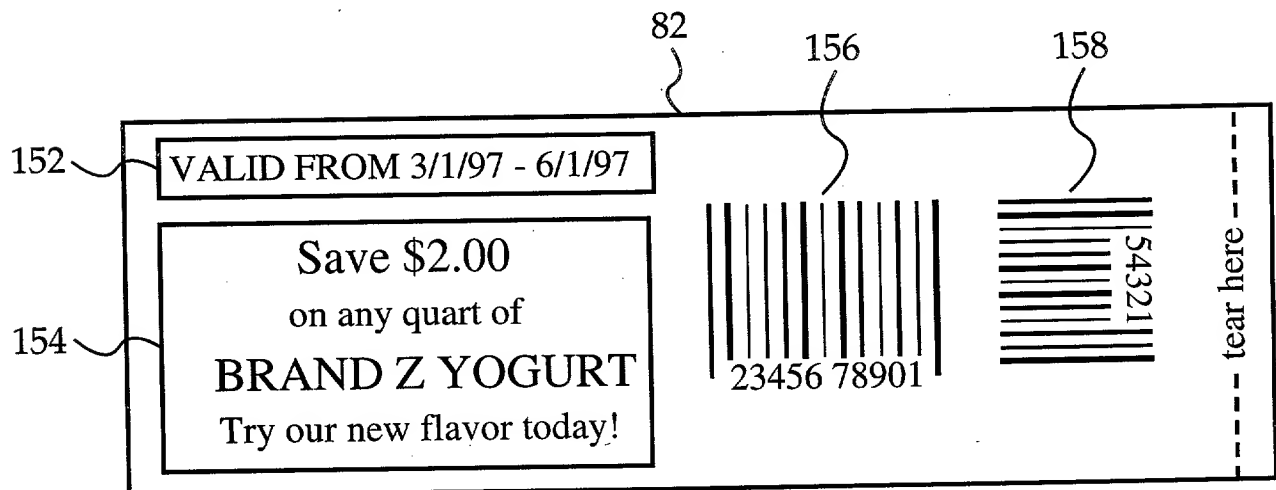
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**FIG. 10**



**FIG. 11**



**FIG. 12**

80

# PATIENT REPORT

PATIENT:

LINDSEY, DAN



DATE OF SURVEY:

MARCH 15, 1997



62

## ANSWERS

HOW WELL ARE YOU FOLLOWING  
YOUR TREATMENT PLAN?

BADLY

HOW MANY HYPOGLYCEMIC EPISODES  
HAVE YOU HAD IN THE PAST WEEK?

0

HOW MANY HYPERGLYCEMIC EPISODES  
HAVE YOU HAD IN THE PAST WEEK?

1

DID YOU TEST YOUR BLOOD SUGAR  
BEFORE BREAKFAST THIS MORNING?

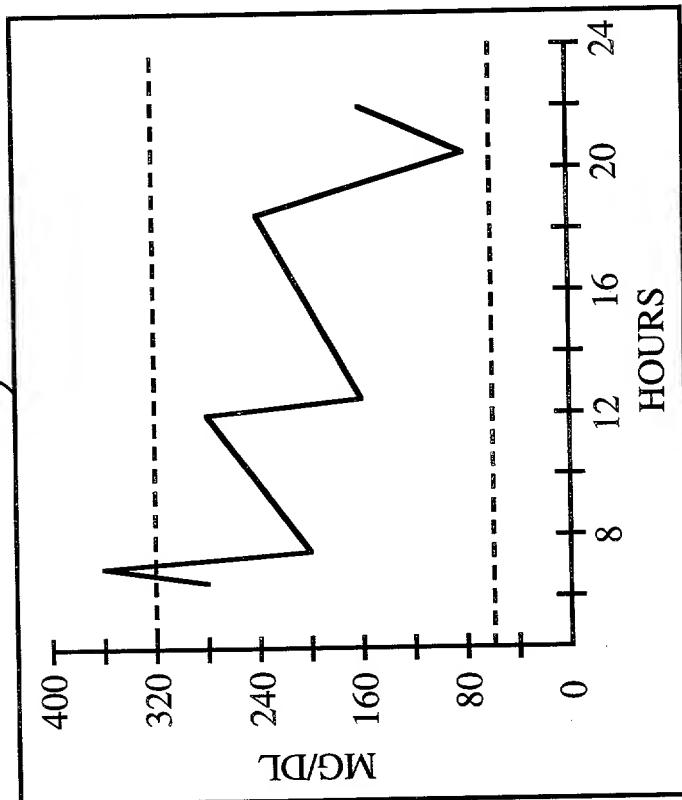
YES

DID YOU EXERCISE TODAY?

NO

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160



HOURS

STATUS:

NON-COMPLIANT

162

FIG. 13



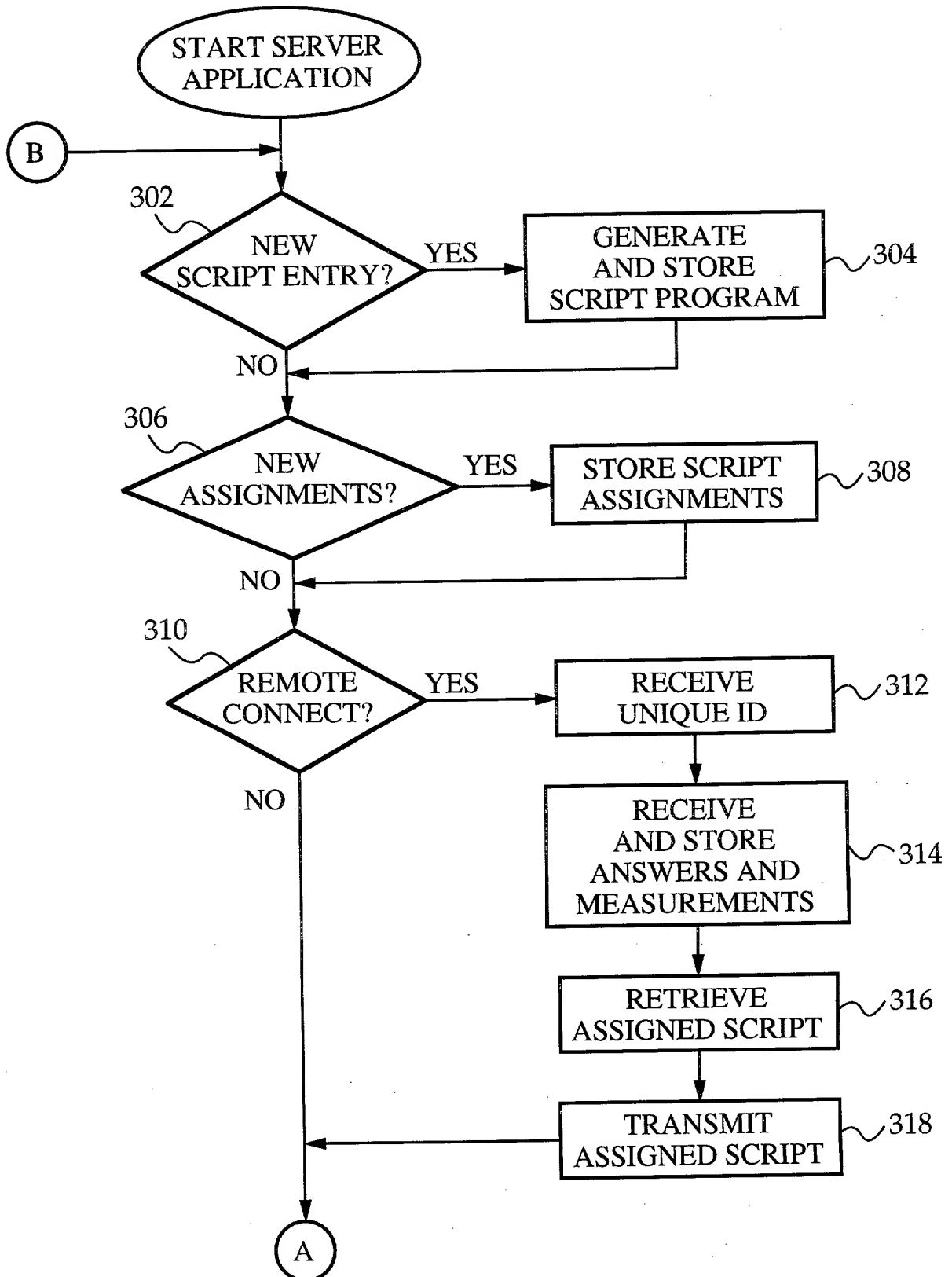
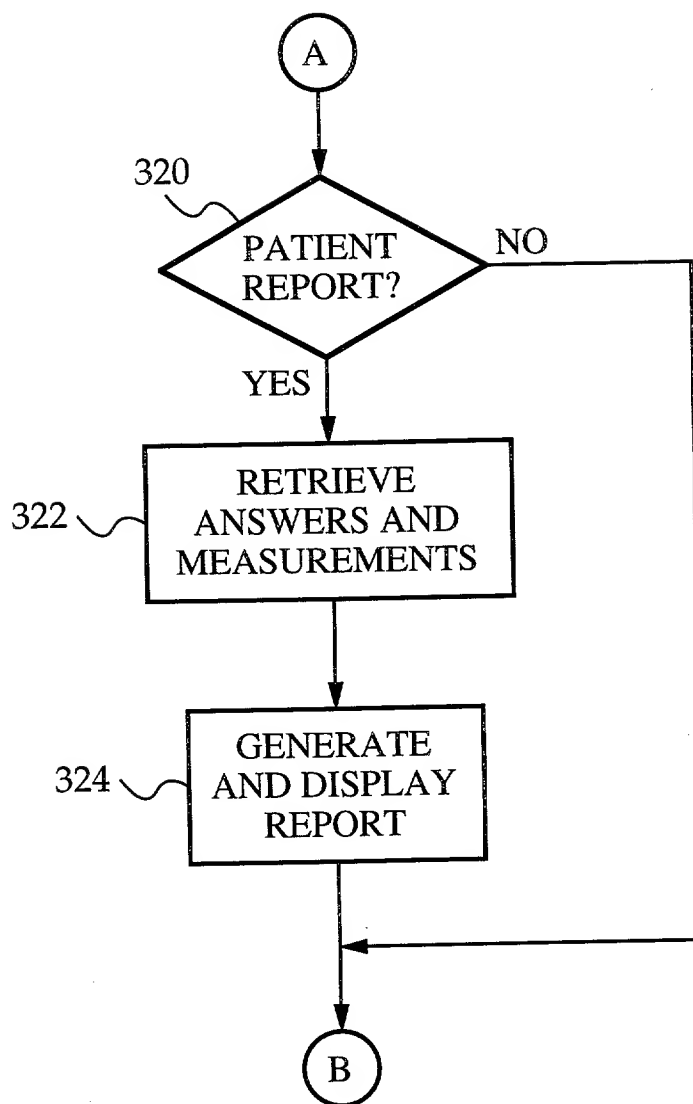


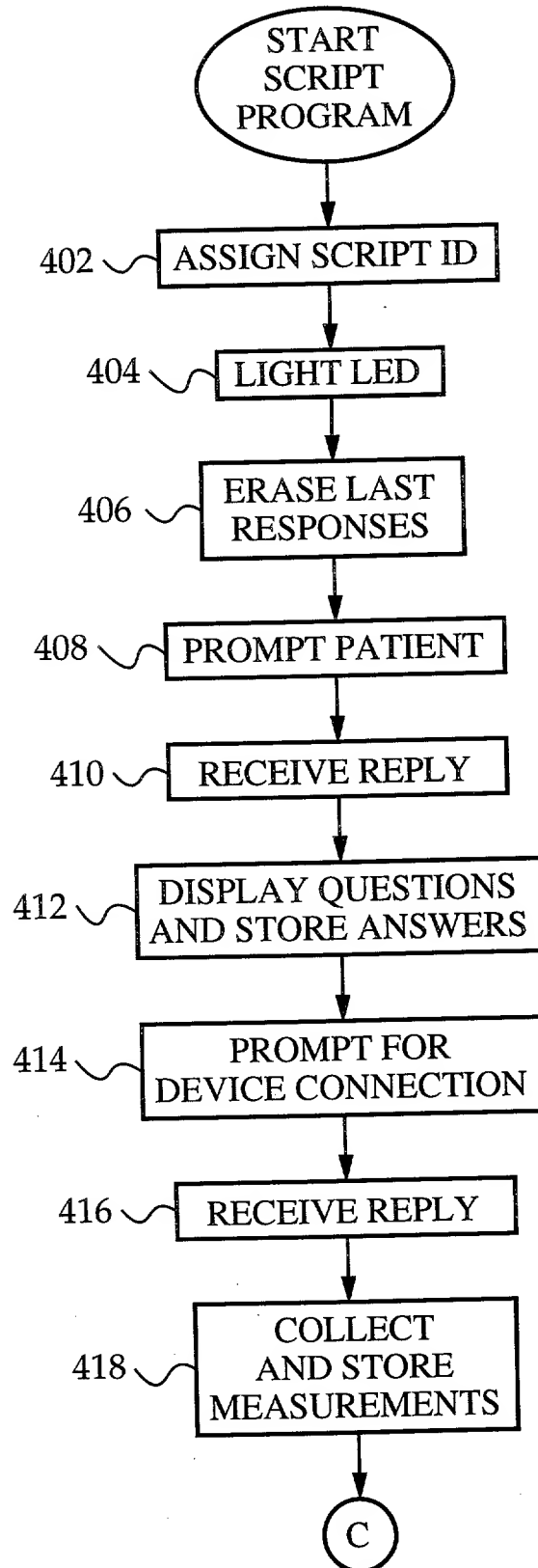
FIG. 14A

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**FIG. 14B**

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**FIG. 15A**

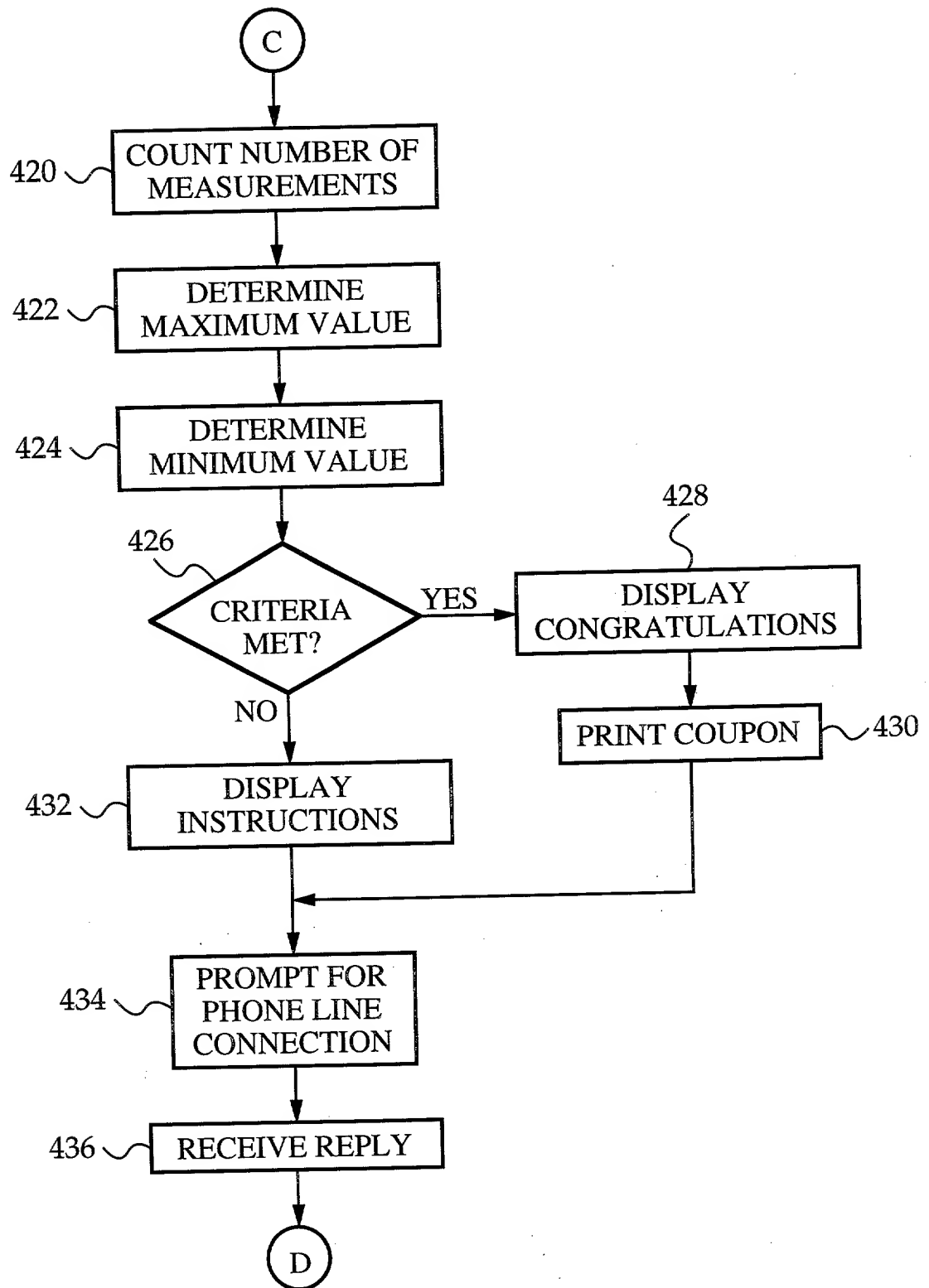
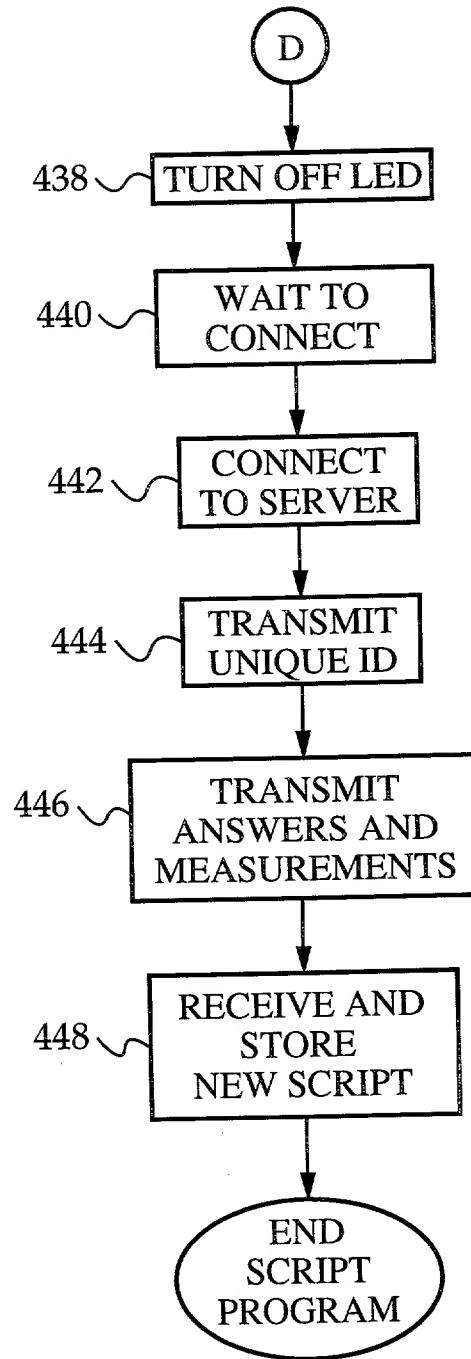


FIG. 15B



**FIG. 15C**

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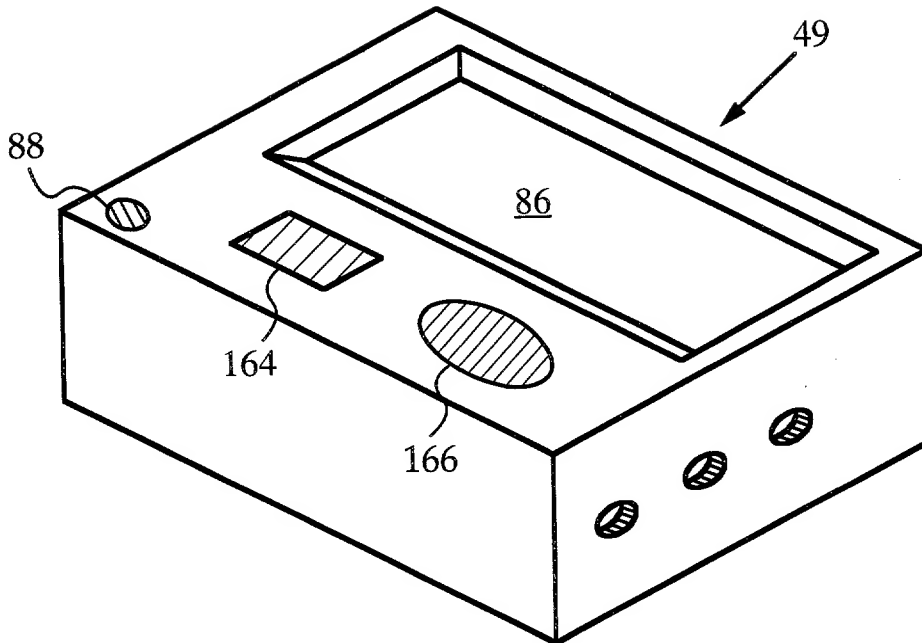


FIG. 16

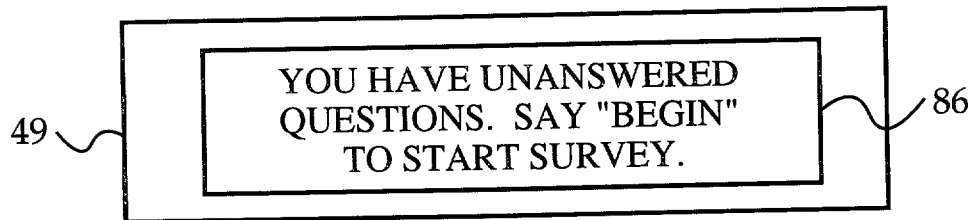


FIG. 17

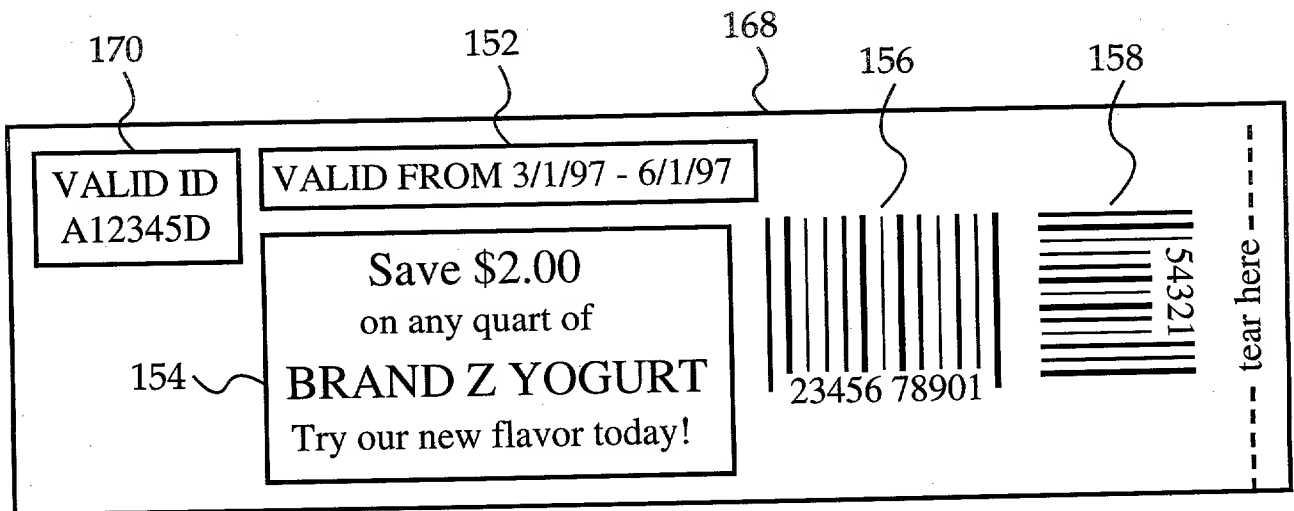


FIG. 18

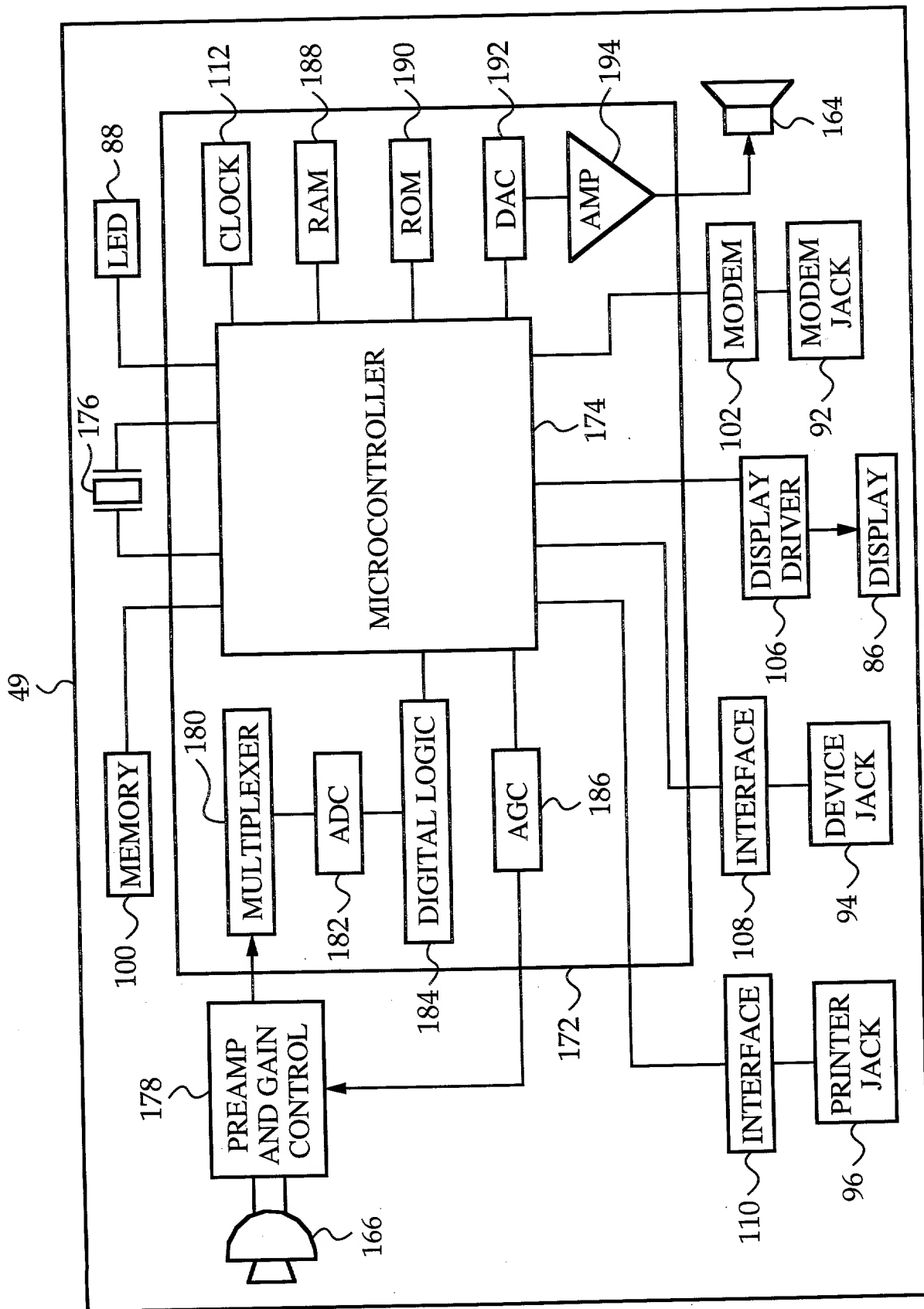
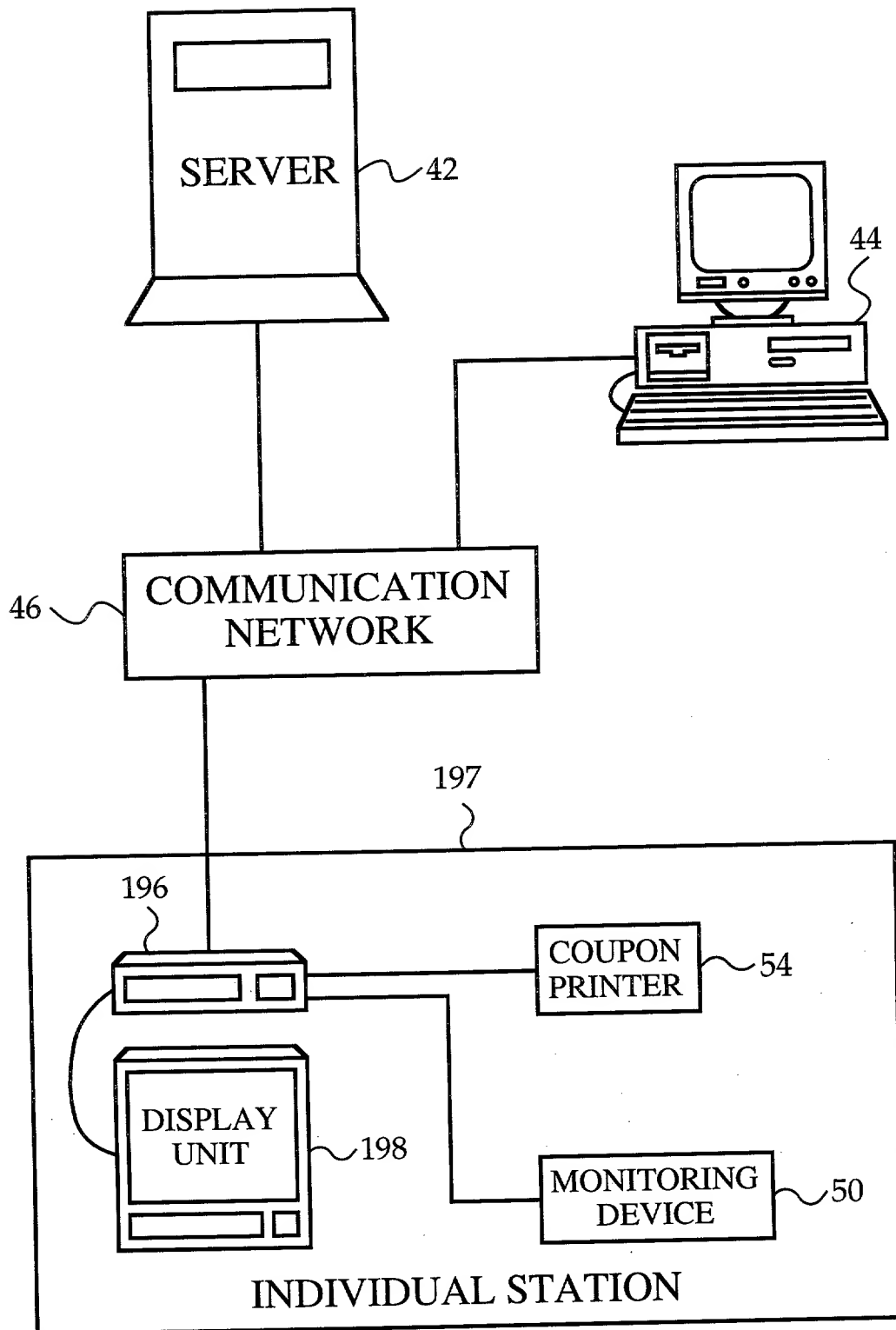


FIG. 19



**FIG. 20**



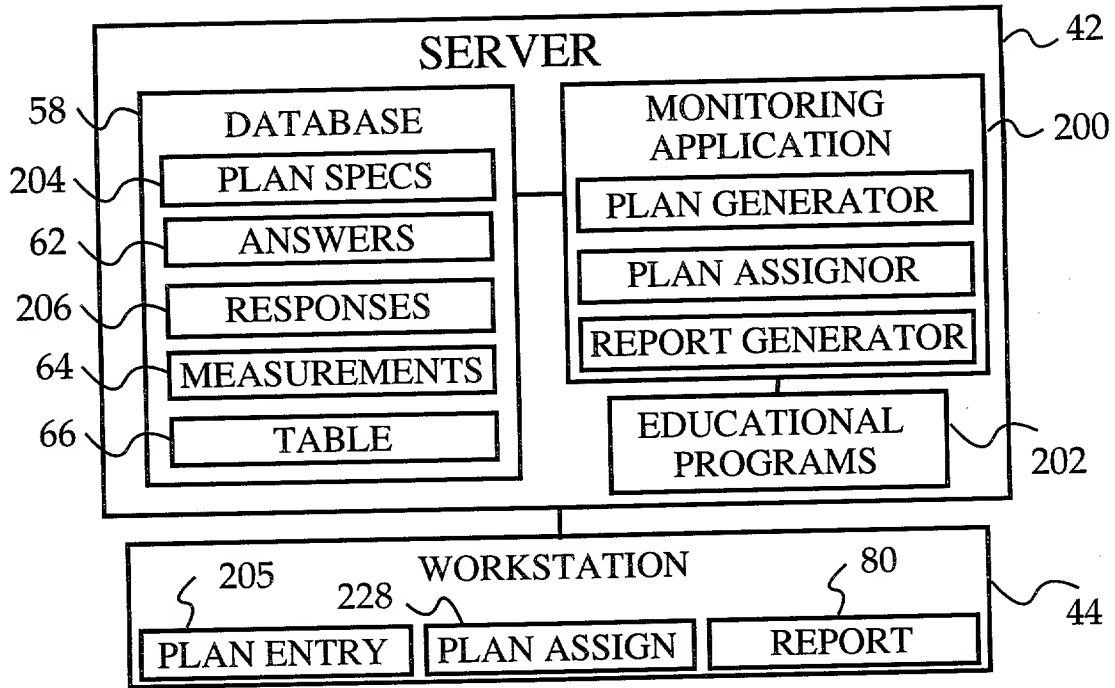


FIG. 21

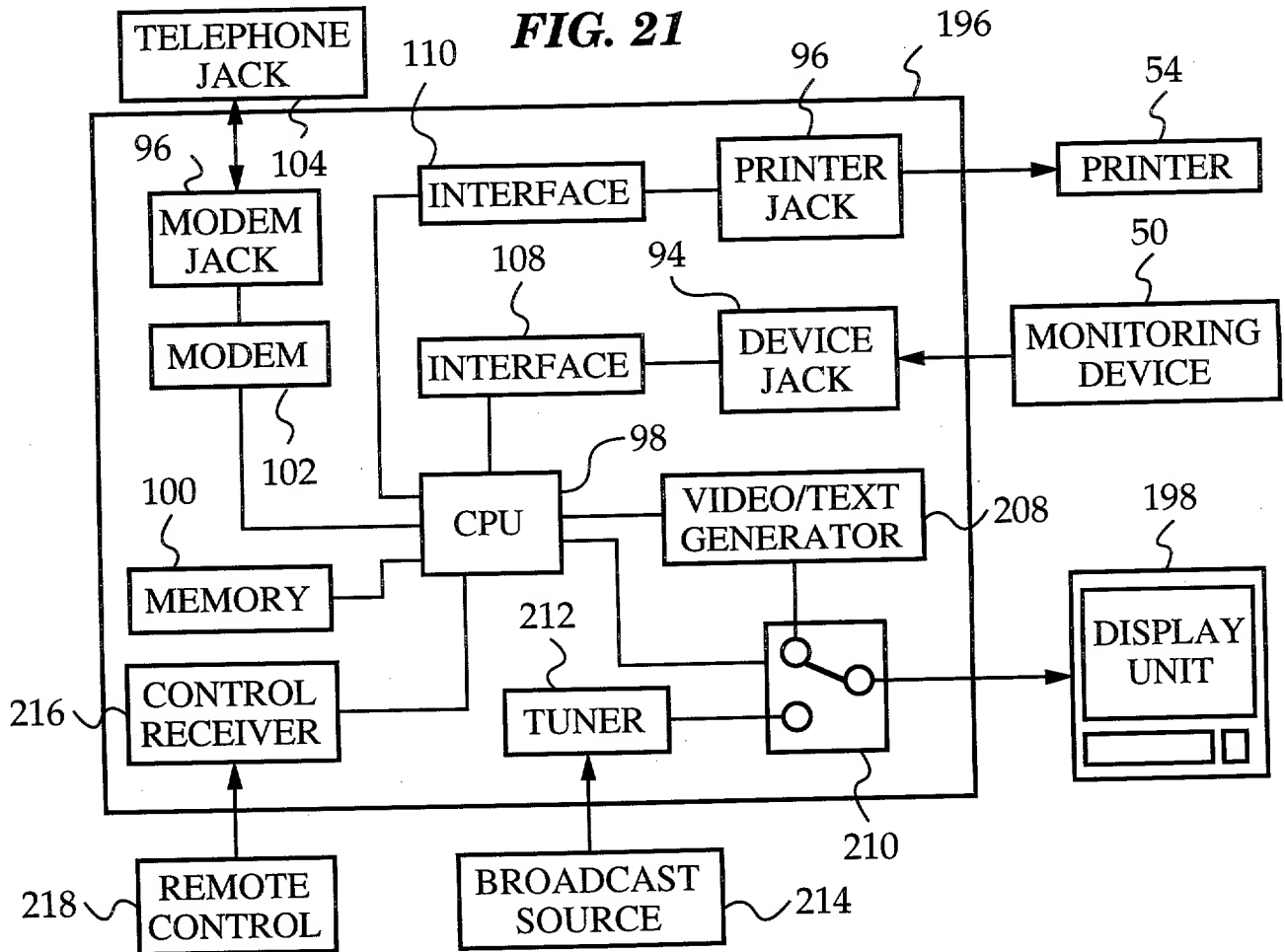


FIG. 22

**PLAN SPECIFICATION SCREEN**

PLAN NAME: DIABETES PLAN 2 ~ 116

<u>COMPLIANCE QUESTIONS</u>	<u>MONITORING DEVICE TYPE</u>
118 ~ <span style="border: 1px solid black; padding: 2px;">QUESTION 1</span>	124 ~ <input checked="" type="checkbox"/> GLUCOSE MONITOR
<span style="border: 1px solid black; padding: 2px;">QUESTION 2</span>	<input type="checkbox"/> BP CUFF
<span style="border: 1px solid black; padding: 2px;">QUESTION 3</span>	<input type="checkbox"/> PEAK FLOW METER
<span style="border: 1px solid black; padding: 2px;">QUESTION 4</span>	<input type="checkbox"/> WEIGHT SCALE
<span style="border: 1px solid black; padding: 2px;">QUESTION 5</span>	

SELECT EDUCATIONAL PROGRAM

222 ~ ☒ TRAVELING WITH DIABETES  
☐ TREATING YOUR ASTHMA  
☐ SUCCESS IN WEIGHT LOSS

SELECT EVALUATION CRITERIA

126 ~ <input checked="" type="checkbox"/> MINIMUM MEASUREMENT VALUE	<span style="border: 1px solid black; padding: 2px;">60 MG/DL</span> ~ 128
<input checked="" type="checkbox"/> MAXIMUM MEASUREMENT VALUE	<span style="border: 1px solid black; padding: 2px;">320 MG/DL</span>
<input checked="" type="checkbox"/> NUMBER OF MEASUREMENTS	<span style="border: 1px solid black; padding: 2px;">14</span>
<input checked="" type="checkbox"/> MINIMUM QUESTION SCORE	<span style="border: 1px solid black; padding: 2px;">COMPLETED</span>
<input checked="" type="checkbox"/> MINIMUM PROGRAM SCORE	<span style="border: 1px solid black; padding: 2px;">COMPLETED</span>

SELECT COUPON TYPE

130 ~ ☒ SUGAR-FREE FROZEN YOGURT  
☐ SUGAR-FREE FRUIT BAR  
☐ SUGAR-FREE POPSICLE

OK ~ 224  
CANCEL ~ 226

MONITORING INTERVAL: 7 DAYS ▽ ~ 134

**FIG. 23**

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**PLAN ASSIGNMENT SCREEN**

AVAILABLE PLANS:	PATIENTS:
230 <input checked="" type="checkbox"/> <u>DIABETES PLAN 1</u>	232 <input checked="" type="checkbox"/> <u>DAN LINDSEY</u>
<input type="checkbox"/> <u>DIABETES PLAN 2</u>	<input type="checkbox"/> <u>MARK SMITH</u>
<input type="checkbox"/> <u>OBESITY PLAN 1</u>	236 <input type="checkbox"/> <u>DEAN JONES</u>
234 <input type="button" value="ADD PLAN"/>	<input type="button" value="ASSIGN PLAN"/>
	<input type="button" value="DELETE PLAN"/> 238

**FIG. 24**

198

**COMPLIANCE QUESTIONNAIRE**

1. HOW WELL ARE YOU FOLLOWING YOUR TREATMENT PLAN? PLEASE ENTER A NUMBER AS FOLLOWS:  
1 = VERY BADLY, 2 = BADLY, 3 = WELL, 4 = VERY WELL 2
2. HOW MANY HYPOGLYCEMIC EPISODES HAVE YOU HAD IN THE PAST WEEK? 1
3. HOW MANY HYPERGLYCEMIC EPISODES HAVE YOU HAD IN THE PAST WEEK? 0
4. DID YOU TEST YOUR BLOOD SUGAR BEFORE BREAKFAST THIS MORNING? PLEASE ENTER A NUMBER AS FOLLOWS:  
1 = YES, 2 = NO 1
5. DID YOU EXERCISE TODAY? PLEASE ENTER A NUMBER AS FOLLOWS: 1 = YES, 2 = NO 2

**FIG. 25**

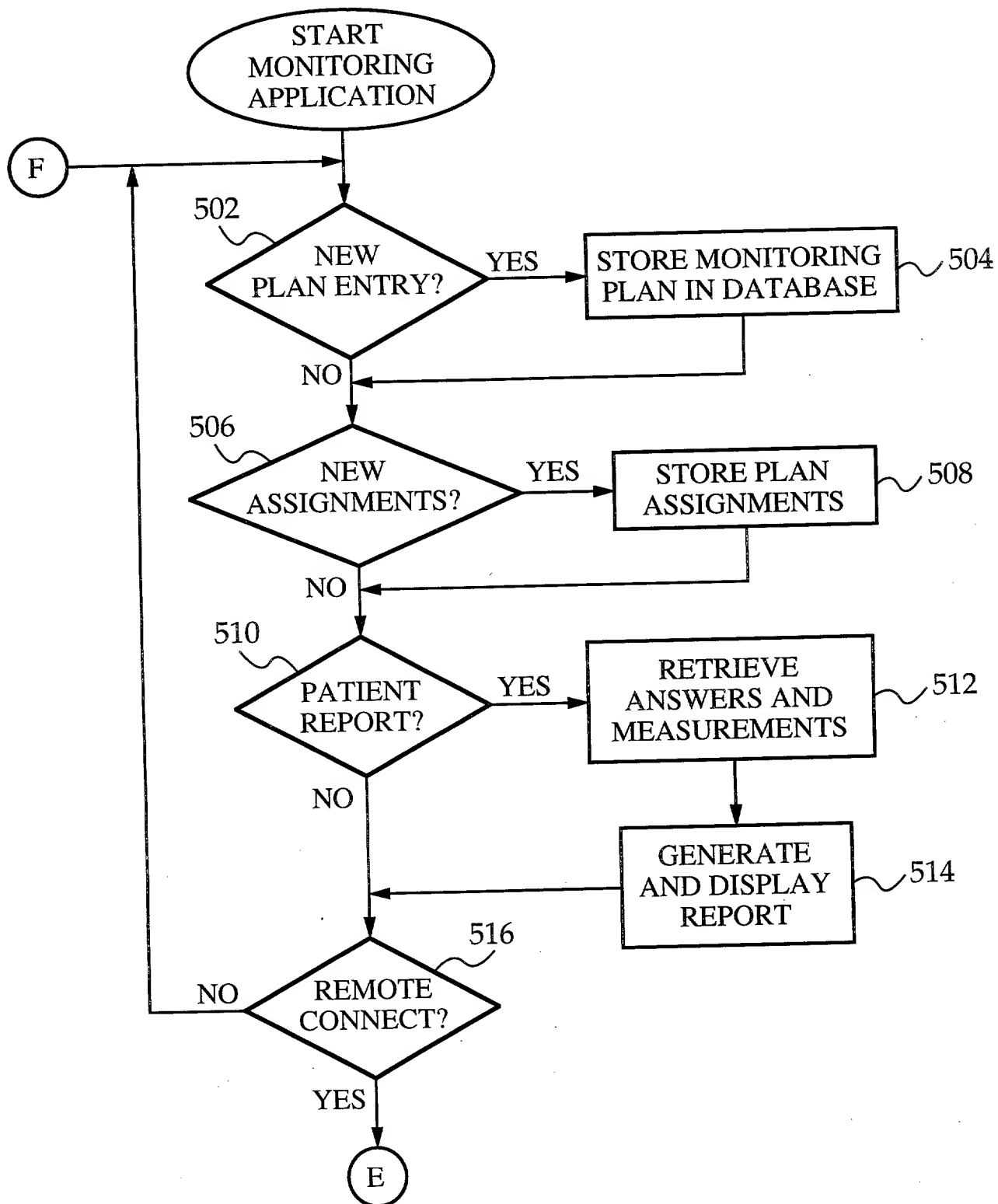


FIG. 26A

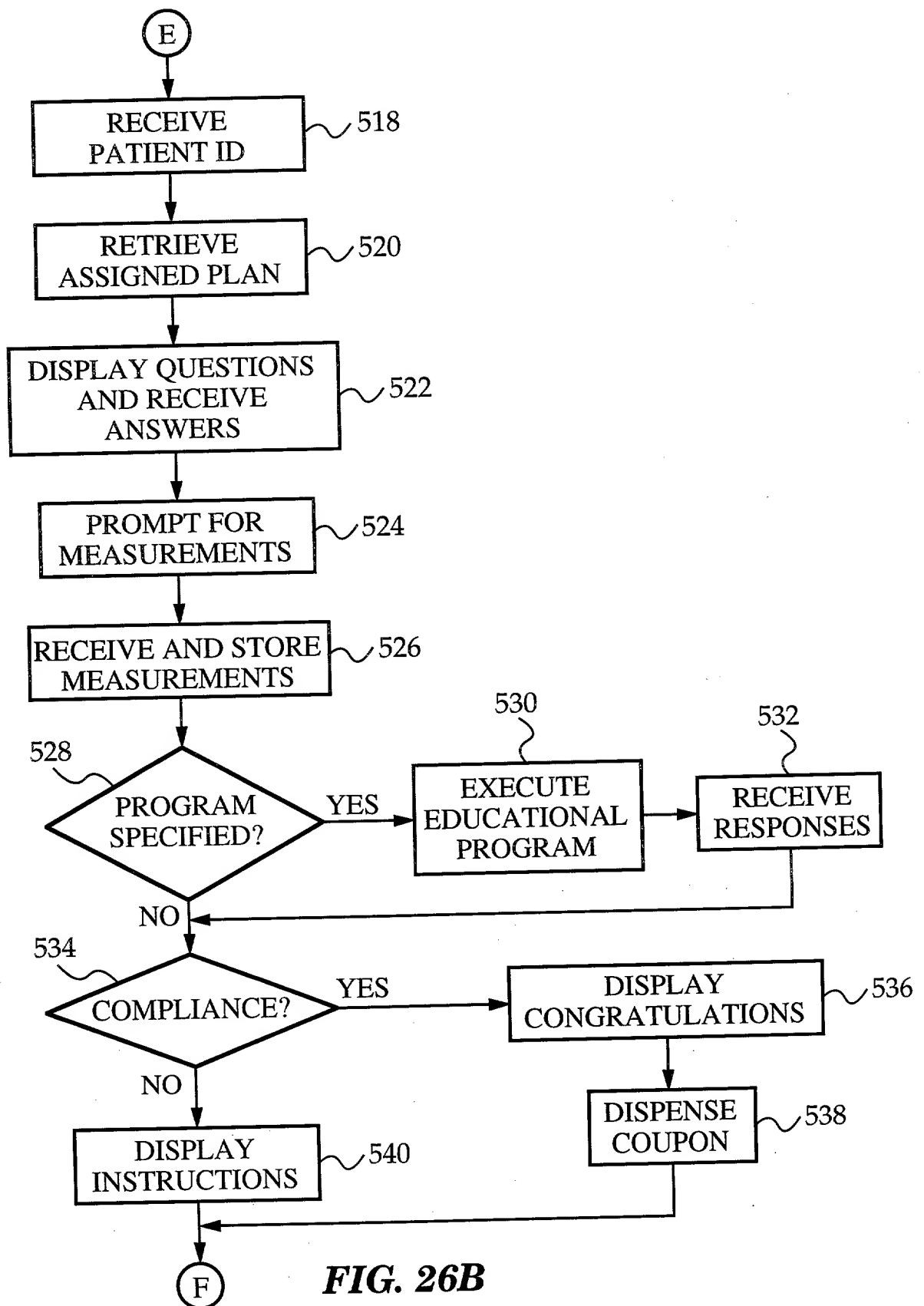


FIG. 26B

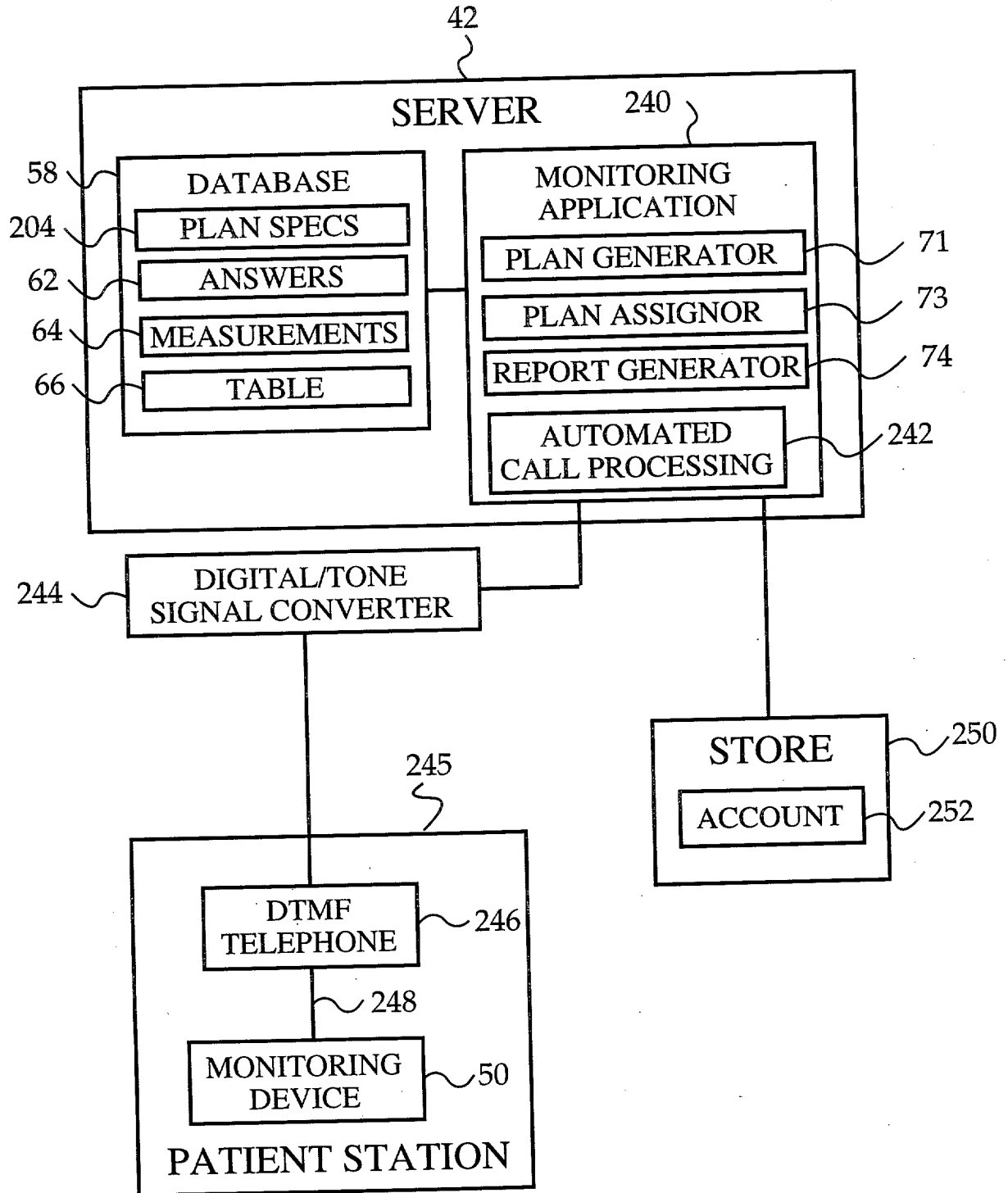


FIG. 27

**PLAN SPECIFICATION SCREEN**

PLAN NAME:  116

<u>COMPLIANCE QUESTIONS</u>	<u>MONITORING DEVICE TYPE</u>
118 <input checked="" type="checkbox"/> QUESTION 1 <input type="checkbox"/> QUESTION 2 <input type="checkbox"/> QUESTION 3 <input type="checkbox"/> QUESTION 4 <input type="checkbox"/> QUESTION 5	124 <input checked="" type="checkbox"/> GLUCOSE MONITOR <input type="checkbox"/> BP CUFF <input type="checkbox"/> PEAK FLOW METER <input type="checkbox"/> WEIGHT SCALE

SELECT EVALUATION CRITERIA

126 <input checked="" type="checkbox"/> MINIMUM MEASUREMENT VALUE	<input type="text" value="60 MG/DL"/> 128
<input checked="" type="checkbox"/> MAXIMUM MEASUREMENT VALUE	<input type="text" value="320 MG/DL"/>
<input checked="" type="checkbox"/> NUMBER OF MEASUREMENTS	<input type="text" value="14"/>
<input checked="" type="checkbox"/> MINIMUM QUESTION SCORE	<input type="text" value="COMPLETED"/>

SELECT REWARD ACCOUNT

254 <input checked="" type="checkbox"/> FIFTH STREET PHARMACY	
<input type="checkbox"/> ALLEN'S DEPARTMENT STORE	
<input type="checkbox"/> BOB'S SUPERMARKET	

MONITORING INTERVAL:   134

224  
 224

FIG. 28

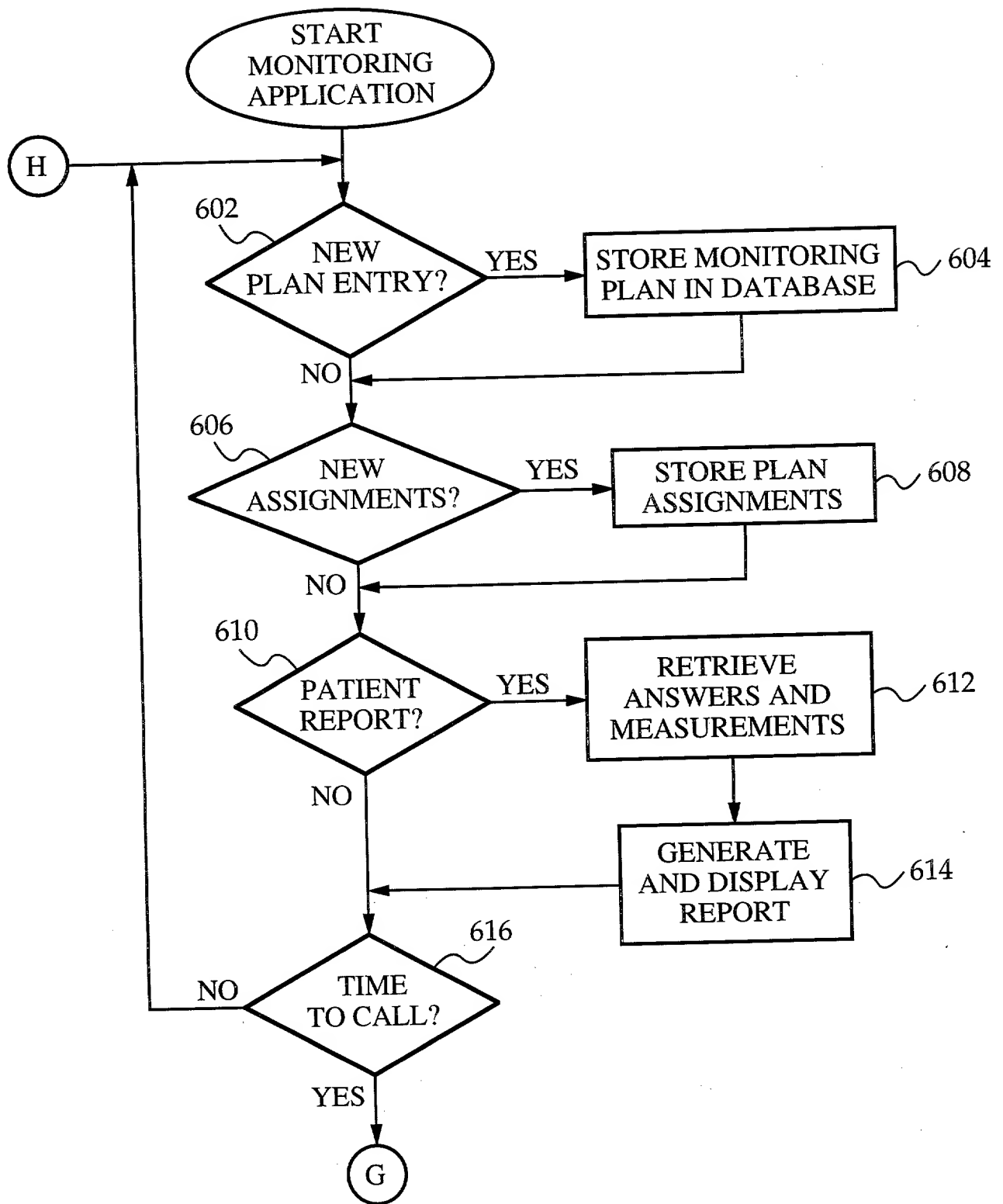


FIG. 29A



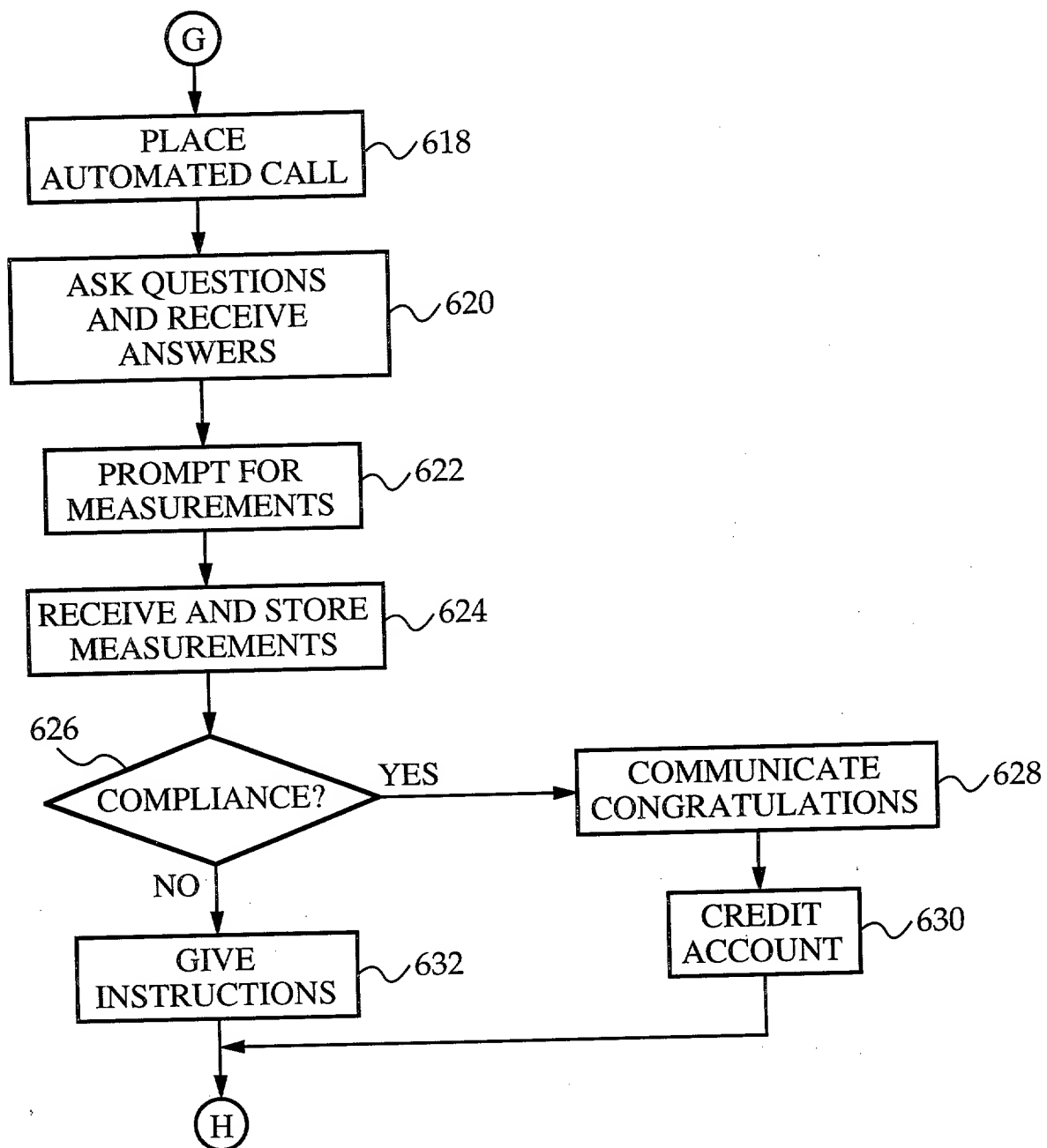


FIG. 29B

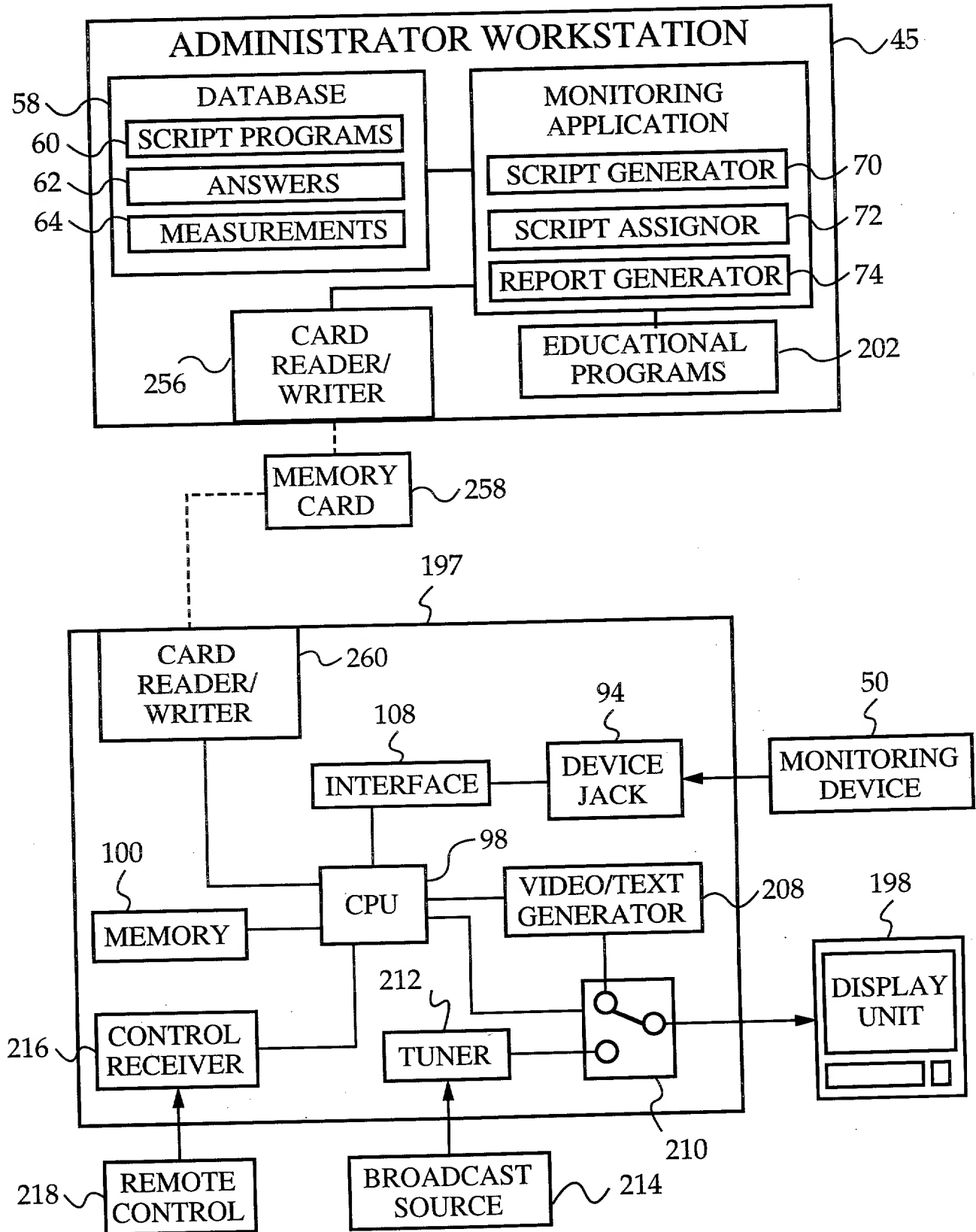


FIG. 30

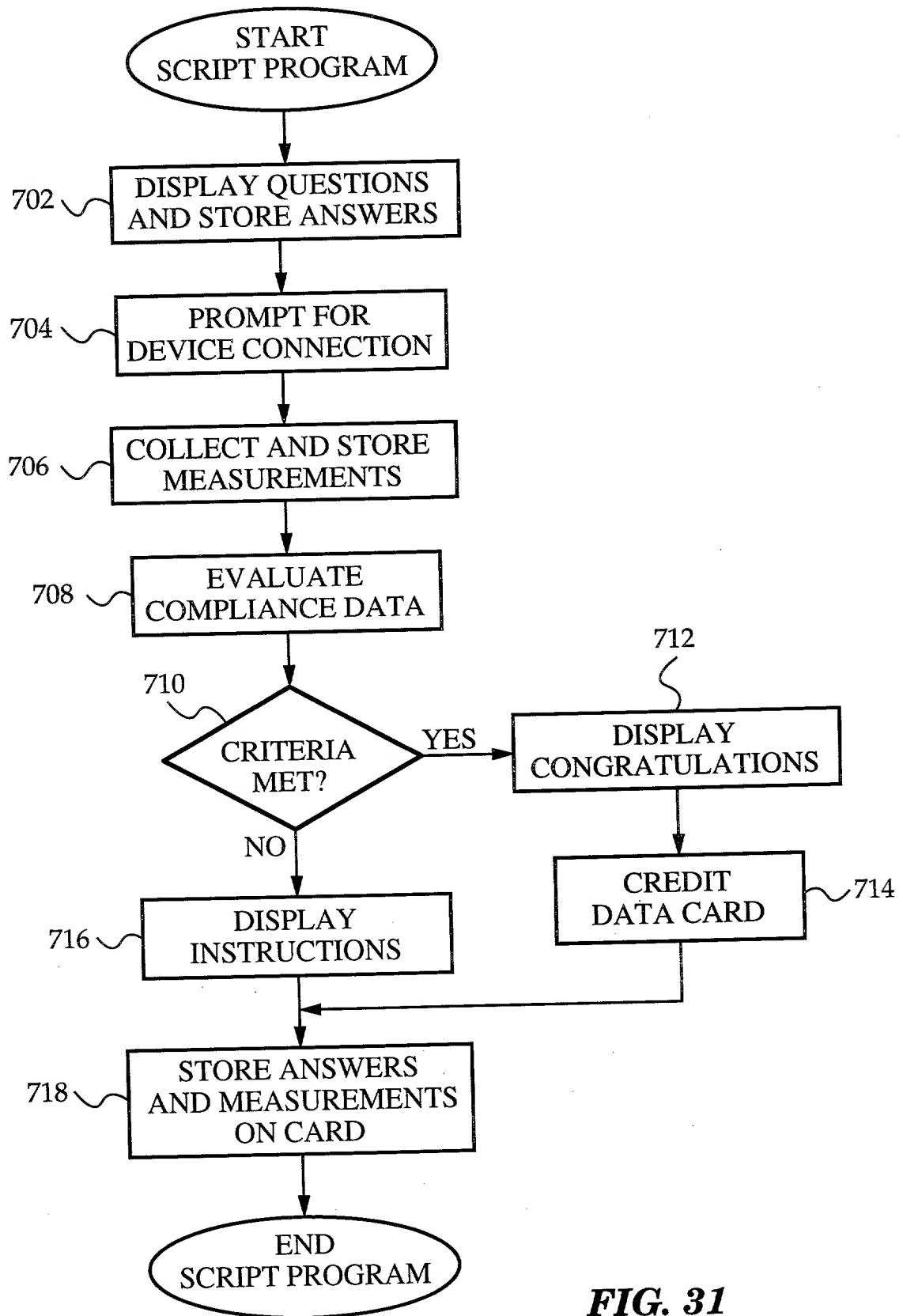


FIG. 31

## Declaration for Patent Application and Power of Attorney

As a below named inventor, I hereby declare that my residence, post office address, and citizenship are as stated below next to my name, and that I believe I am the original, first and sole inventor (if only one is listed) or an original, first and joint inventor (if plural names are listed) of the subject matter which is claimed and for which a patent is sought on the invention described in the attached specification entitled **Computerized Reward System for Encouraging Participation in a Health Management Program.**

First or Sole Inventor:	Full name:	<b>STEPHEN J. BROWN</b>	Citizenship:	<b>U.S.A.</b>
	Residence:	<b>1525 Nadina Street, San Mateo, CA 94402</b>		
	Postal Address:	<b>same as above</b>		

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

### PRIOR FOREIGN APPLICATION(S)

Country	Application Number	Date of Filing	Priority Claimed Under 35 U.S.C. §119
<b>NONE</b>			<input type="checkbox"/> Yes <input type="checkbox"/> No

I claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

### PRIOR U. S. APPLICATION(S)

Application No.	Filing Date	Status
<b>08/771,951</b>	<b>12/23/96</b>	<input type="checkbox"/> Provisional <input type="checkbox"/> Patented <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Provisional

I hereby appoint Thomas J. McFarlane, Reg. No. 39,299, Marek Alboszta, Reg. No. 39,894, and Mark B. Floyd, Reg. No. P-41,022 as my agents with full power of substitution to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith. Direct all correspondence to:

**Marek Alboszta**  
426 Lowell Avenue  
Palo Alto, CA 94301-3813  
Telephone: 415-321-6630  
Fax: 415-321-1621.

The attorney docket number for this case is: **RYA-127.**

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Title 18, §1001 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

INVENTOR SIGNATURE(S)

  
**STEPHEN J. BROWN**

  
Date